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Assessing the Extent of Monetary Poverty in the Syrian Arab Republic after a Decade of Conflict

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Abstract

The data for estimating monetary poverty in the Syrian Arab Republic are outdated. In the context of data scarcity, this paper aims to propose a methodological approach to address the knowledge gap regarding welfare in Syria over the past decade. In particular, the analysis provides (i) updated pre-conflict poverty baseline estimates based on grouped data from the 2009 Household Income and Expenditure Survey; (ii) supporting evidence on the viability of using Humanitarian Needs Assessment Programme Demographic and Water Supply, Sanitation, and Hygiene 2022 survey data for the estimation of monetary poverty in 2022; and (iii) supporting theoretical and empirical evidence to identify growth in per capita gross domestic product in current prices deflated by Consumer Price Index as the best metric to project poverty using a nowcasting approach. Based on this analysis, the paper proposes to use 2022 Humanitarian Needs Assessment Programme–based poverty estimates to anchor the most recent estimates to the best available evidence, and to interpolate the poverty evolution obtained from back-casting 2022 and nowcasting 2009 poverty estimates over 2009–22 using the growth rate of per capita gross domestic product in current prices, deflated by the Consumer Price Index with a passthrough of 0.7.

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Introduction

More than a decade of conflict has had devastating socio-economic consequences for the Syrian Arab Republic. In 2011 Syria was a fast-growing middle-income country. Fast forward 10 years, Syria is a low-income country still engulfed in violence and struggling with a deep economic crisis. Conflict has claimed the lives of at least 350,209 individuals[1] and more than half of Syria's pre-conflict population remains displaced, including 6.6 million IDPs in Syria and 6.2 million Syrian refugees displaced abroad. Between 2011 and 2019, the Syrian economy is estimated to have contracted by more than 50 percent in real terms. Over the same period, extreme poverty is projected to have increased manyfold, reflecting deterioration of livelihood opportunities and progressive depletion of household coping capacity.[2]

Over the last four years, the negative welfare impact of conflict has been further exacerbated by regional and global shocks. The conflict in Syria has exacerbated the country's vulnerability to external shocks. The intensification of US sanctions on the Islamic Republic of Iran after the collapse of the Nuclear Treaty in November 2018 impacted Syrian imports of Iranian fuel, leading to petrol and gas shortages which sparked sharp price increases for both food and non-food items in early 2019. Moreover, the financial crisis in Lebanon by end 2019 had ripple effects on the Syrian economy, further contributing to soaring prices.[3] The COVID-19 crisis and drought conditions in the Northeastern region, Syria's traditional breadbasket which is still heavily affected by conflict and new waves of population displacement, further contributed to the food security challenge of the Syrian population. As of February 2022, before the war in Ukraine, WFP estimates that 12 million people, about 55 percent of the Syrian population, were facing acute food insecurity, up 51 percent compared to 2019.

Household welfare analysis in Syria is severely constrained by data availability. Similar to other conflict-affected countries, estimates of the living standards of the Syrian population are outdated due to the lack of official and comparable household budget surveys after the onset of war. The latest official household budget survey data available on the World Bank's Poverty and Inequality Platform (PIP)[4] dates back to 2003, despite the existence of two more recent budget surveys conducted by Syria's Statistical Office in 2007 and 2009.[5] As such, the World Bank has not been publishing poverty estimates for Syria post 2003.

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[1] Estimates of the total death toll of the Syrian war vary depending on the methodology and reporting agency. In 2021, the UN's human rights office (OHCHR) released a tally of 350,200 deaths including both civilians and combatants. The count is based on a strict methodology requiring the deceased's full name, date of death and location of the body and should therefore be interpreted as an under-estimation of the actual number of war-related deaths. The Syrian Observatory for Human Rights (SOHR) estimates an overall death toll of 610,000 people over 11 years of conflict, of which 160,681 are represented by civilians (120,158 men, 15,237 women and 25,286 children).

[2] ESCWA (2020) "Syria at war: eight years on", United Nations Economic and Social Commission for Western Asia, Beirut, 2020.

[3] Syrians, especially traders, have been depending on banks in Lebanon for accessing foreign currency (dollars). However, due to the financial crisis in Lebanon and with Lebanese banks limiting the release of funds, many Syrians have lost access to their savings. The heavily reduced release of cash from Lebanese banks has meant that dollars have become scarce in Syria, pushing-up the informal market exchange rate. As a result, prices of food and non-food items have risen across Syria.

[4] The Poverty and Inequality Platform (PIP) is a publicly available dataset of World Bank's official country-level, regional, and global estimates of poverty. Most of the data in PIP comes from the Global Monitoring Database, which is the World Bank's repository of harmonized multitopic income and expenditure household surveys used to monitor global poverty. PIP contains more than 2,000 surveys from 168 countries covering 98% of the world's population. The data available in PIP are standardized as far as possible but differences exist with regards to the method of data collection, and whether the welfare aggregate is based on income or consumption.

[5] These surveys were used by UNDP and ESCWA to estimate national poverty estimates (see Abu-Ismail, Abdel-Ghadir and El-Laithy (2011) "Poverty and Inequality in Syria 1997-2007", Arab Development Challenges Report, Background paper 2011/05).

Still, lineup estimates of poverty in Syria based on a distribution neutral nowcasting approach using growth in Household Final Consumption Expenditure (HFCE – constant prices, unit-passthrough) have so far been used for the production of global and regional poverty estimates.

In the context of data scarcity, this paper aims to propose a methodological approach to address the knowledge gap regarding welfare in Syria over the last decade. In particular, the objective of this paper is to (i) fill the knowledge gap on the extent of monetary poverty pre-conflict using international poverty lines for 2007 and 2009; (ii) assess the strengths and weaknesses of poverty estimates based on household survey data collected in 2021 and 2022 under the Humanitarian Needs Assessment Programme (HNAP); (iii) conduct a sensitivity analysis of distribution neutral nowcasting approaches, identifying the most credible approach given NA data limitations; (iv) triangulate estimates obtained through various approaches with indirect evidence on economic activity based on georeferenced data; and lastly (v) propose a methodological approach to assess the evolution of monetary poverty in Syria during the conflict period.

1 Updating pre-conflict poverty estimates

Official poverty estimates for Syria are available for 1997, 2003 and 2007 and produced with UNDP technical assistance. Poverty measurement builds on nationally representative household budget survey data from the Household Income and Expenditure Surveys (HIES) conducted by the Central Bureau for Statistics (CBS – the official statistical agency in Syria).[6] CBS conducted another round of the HIES in 2009-10, but no poverty estimates were released. Since the conflict erupted in 2011, no new rounds of HIES were conducted.

The methodology adopted by UNDP to compute official poverty estimates builds on the construction of "household-specific poverty lines", reflecting caloric requirements which vary by household composition and regional variation in the cost per calory and non-food allowance.[7] Two different poverty thresholds are considered, one reflecting basic needs (referred to as the "extreme" or "lower" poverty line – henceforth LPL) and a more generous one reflecting a "reasonable" level of basic needs (referred to as the "moderate" or "upper" poverty line – henceforth HPL). The LPL – once expressed in USD using the 2011 PPP conversion factor – is close to the international poverty line for lower-middle-income countries ($3.65 at 2011 PPP), while the UPL is close to the one for upper-middle-income countries. Table 1 below summarizes the available poverty estimates.

Table 1: Official poverty rate and national poverty lines

	1997	2003	2007
		Poverty rate (%)	
Lower Poverty line (LPL)	14.26	11.39	12.3
Upper Poverty line (UPL)	33.22	30.13	33.6
	National average of household specific poverty lines - SYP per month		
Lower Poverty line (LPL)	NA	1458	2183
		($3.6 daily, 2011PPP)	*($4.2 daily, 2011PPP)*
		($3.9 daily, 2017PPP)	*($4.6 daily, 2017PPP)*
Upper Poverty line (UPL)	NA	2052	3037
		($5.1 daily, 2011PPP)	*($5.8 daily, 2011PPP)*
		($5.5 daily, 2017PPP)	*($6.4 daily, 2017PPP)*

Source: Abu-Ismail et al. (2011); El Laithy, Abu-Ismail (2005). World Bank staff estimates for 2011 PPP conversion.
Notes: SYP value of the poverty lines is expressed in current prices. Daily 2011 PPP value of the PL provided in parenthesis for reference.

At present, the World Bank Poverty and Inequality Platform (PIP) only includes poverty estimates at international poverty lines for 2003, the only year for which microdata are available in the Global Poverty Monitoring Database. However, building on tabulations available in Abu-Ismail et al. (2011) and on the CBS website, it is possible to gather all relevant information to compute grouped-data poverty estimates at international poverty lines for 2007 and for 2009, hence to update the available pre-conflict baseline poverty series (Box 1).

[6] Information from the HIES 1997 was collected between October 1996 and September 1997; for the HIES 2003 information was collected between July 2003 and June 2004; for the HIES 2007, information was collected between November 2006 and October 2007.
[7] El Laithy, Abu-Ismail (2005).

Box 1: Grouped data poverty estimates

Grouped data are consumption expenditure or income organized in intervals or bins, such as deciles or percentiles. These bins are used to derive a continuous Lorenz curve, which plots the cumulative welfare share (on the y-axis) against the cumulative population share (on the x-axis). Together with information about mean welfare, the Lorenz curve can be used to construct a full distribution. Two approaches are used to derive a Lorenz function, the general quadratic (GQ) Lorenz function and the Beta Lorenz function (Datt 1998). Both functions are parameterized and estimated. The function that provides the best fit is selected for poverty and distributional statistics, conditional on passing normality and validity tests. The GQ Lorenz function is estimated using the following specification:

$L(1-L)=a(p^2-L)+bL(p-1)+c(p-L)$,

where p is the cumulative proportion of the population, L is the cumulative proportion of consumption expenditure or income, and a, b, c are parameter estimates. Poverty and inequality measures are based on the parameter estimates.

The Beta Lorenz function is estimated using the following specification:

$L(p)=p-\theta p^{\gamma}(1-p)^{\delta}$,

where θ, γ, and δ are parameter estimates.

The methodology to estimate poverty starting from grouped data is applied on grouped data information on per household consumption by decile of the welfare distribution in 2007 and in 2009 HIES available from the CBS website. Information on average household size by decile, which is needed to convert household expenditure in per capita terms, was obtained from Prof. Heba El-Laithy, one of the authors of the Abu-Ismail et al. (2011) study who was in possession of 2007 HIES microdata. Through this consultancy, grouped data poverty estimates for 2007 were compared and validated with estimates based on the full distribution. Lacking information on average household size by decile for 2009, per capita expenditure by decile in 2009 is obtained using 2007 estimates.

Source: Poverty and Inequality Platform Methodology Handbook

Table 2 below reports grouped data estimates of poverty incidence at different values of international poverty lines for 2007 and for 2009. Based on grouped-data estimation approach, in 2009, the latest year for which data are available before conflict started, Syria's poverty at LMIC was 14.50 percent using 2011 PPP and 16.02 percent using 2017 PPP, whereas corresponding estimates based on the UMIC poverty line were 40.29 percent (2011 PPP) and 47.52 percent (2017 PPP). When comparing to 2007 group-based estimates, evidence suggests that poverty had stagnated, possibly reflecting the impact of the drought that affected the country over the period.

Table 2: Poverty estimates using income class international poverty lines

			Poverty Rate (%)		
			Estimates based on microdata	Estimates based on grouped-data	
	PPP	PL value	2003	2007	2009
LIC	2011	1.9	0.79	2.43	2.08
	2017	2.15	0.93	2.83	2.44
LMIC	2011	3.2	9.48	14.90	14.50
	2017	3.65	10.89	16.36	16.02
UMIC	2011	5.5	38.37	39.47	40.29
	2017	6.85	47.26	46.43	47.52

Source: World Bank staff estimates

2 Post-conflict poverty projections: Review of existing estimates

2.1 Post-conflict estimates based on nowcasting methodologies

Nowcasting methodologies are typically used to fill data gaps in countries that lack up-to-date survey-based poverty estimates. Nowcasting approaches vary in terms of both methodological assumptions as well as in terms of data sources used in the analysis.

The simplest nowcasting approach – which is used by the World Bank in the production of global poverty estimates – relies on information from national accounts (per capita GDP or household final consumption expenditure) to predict poverty. More specifically, this nowcasting methodology assumes that growth (or shrinkage) in GDP per capita registered since the country's last poverty estimate is fully passed through to the consumption vector that is measured in household surveys (Prydz et al. 2019). Poverty is then estimated using this predicted consumption vector under a "distribution neutral" assumption i.e., assuming that inequality does not change at that each individual is equally affected by the growth/contraction in welfare. While the impact of growth on poverty reduction is well-known (Kraay, 2006; Ferreira and Ravallion, 2009), concerns have emerged related to possible un-reliability of GDP measures in developing countries (Angrist, 2022), as well as the extent to which growth is passed through to welfare in fragile and conflict affected countries (Box 2).

Box 2: Growth rate pass-through in FCS Economies

The assumption of full pass-through works fairly well in economies that are not in Fragile and Conflict-Affected Situations (FCS). However, available evidence suggests that a full pass through assumption is likely inappropriate in case of conflict.

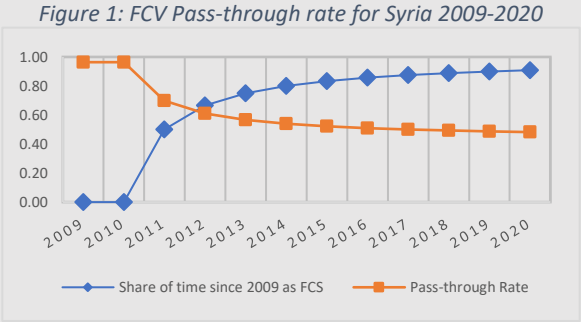
In order to estimate any difference in pass-through in FCS settings, Corral et al. (2020) fitted a regression model on a sample including all countries for which survey consumption estimates are available in PIP over the period 2000 to 2019. In particular, the annualized growth rate in the survey per capita consumption is regressed on annualized growth in GDP per capita, together with an interaction of annualized growth in GDP per capita and the share of time (if any) that each country spent as FCS between 2000 and 2019.

$$Growth_{survey\ mean} = 0.964 * Growth_{GDPpercapita} - 0.530 * Growth_{GDPpercapita} * ShareFCS$$

According to this model, for economies that have never been FCS, 96 percent of GDP growth is passed through to welfare. However, for economies that have been in FCS throughout the entire period, only 43 percent (0. 64 - 0. 30) is passed through.

The reduced pass-through rate indicates that in economies experiencing conflict, violence, or fragility, changes in national accounts are larger than changes in welfare. In particular, for economies in FCS where GDP per capita declined, this implies that the poverty rates estimated using this adjusted pass-through would be lower compared to those estimated under a full pass-through assumption.

Figure 1: FCV Pass-through rate for Syria 2009-2020



Source: Corral et al. (2020)

An alternative nowcasting approach, which bypasses the distribution neutral assumption, relies on growth elasticities of poverty (GEP). Growth elasticities of poverty reveal the percentage change in poverty associated to a 1 percent growth in GDP per capita. Implicitly, the elasticity takes into account both the impact of growth on average welfare as well as changes in the distribution of welfare (Shorrocks, 2013; Datt and Ravallion, 1992). Still, this approach relies on the strong assumption that the relation between growth and poverty does not change over time.

In some cases, poverty nowcasting builds on more articulated microsimulation models. More complex examples of microsimulation models are based on computable general equilibrium (CGE) or general equilibrium macroeconomic models that rely on social accounting matrices or time series macroeconomic data to create "linkage aggregate variables" (LAVs) that are fed into microsimulation models that build on household survey data. However, the high information demands of these models makes them hard to apply in data deprived contexts. A less data demanding approach to microsimulation relies on building behavioral models on household surveys (typically linking labor market outcomes and remittances to individual and households' incomes and consumption) which are then linked to aggregate and sector level macro-economic projections.[8]

Table 3 below provides a summary of the results and methodologies employed in the limited number of studies that have attempted to estimate poverty in Syria during the post-conflict period. Despite their notable limitations, all these studies consistently indicate substantial increases in poverty.[9]

Table 3: Comparative Overview of Post-Conflict Poverty Estimation Studies in Syria

Author	Poverty line	Estimates	Methodological approach
World Bank (2017)	Lower national PL (LPL)	2007: 12.3% 2016: 54.5 – 66.5%	Extrapolation using a growth elasticity of poverty estimated over the period 2003-2007.
ESCWA (2016)	Lower national PL (LPL) Upper national PL (UPL)	2010: 14%; 2015: 50% 2010: 28 %; 2015: 83.4%	NA
ESCWA (2020b)	$1.90 (2011 PPP) intl PL $3.50 (2011 PPP) intl PL	2010: <1%; 2019: 40% 2010: 19%; 2019: 77%	Distribution neutral projections based on the growth of private household

[8] Olivieri et al. (2014).

[9] For a detailed description of each study see Annex 1.

			consumption per capita from NA; unit pass-through
Hamati (2018)	Lower national PL (LPL) Upper national PL (UPL)	2009: 14.9%; 2015: 85.8-75.9% 2009: 29.4%; 2015: 93.1% - 87.5%	Dynamic microsimulation model projections that introduce price, demographic, labor market, and income shocks.

2.2 Post-conflict estimates based on HNAP 2021 Demographic and WASH survey

The scale of Syria's humanitarian crisis and the necessity to inform operations on the ground has prompted UN agencies to develop an articulated system of welfare monitoring: the *Humanitarian Needs Assessment Programme* (HNAP). The HNAP is a joint UN program established in April 2018 with the objective of tracking displacement and return movements, conducting multi-sectoral assessments, and monitoring humanitarian needs inside the country.[10] In addition to collecting data at the community level through key informant interviews, the HNAP also implemented sample-based household surveys whose frame relies on community level population data.[11]

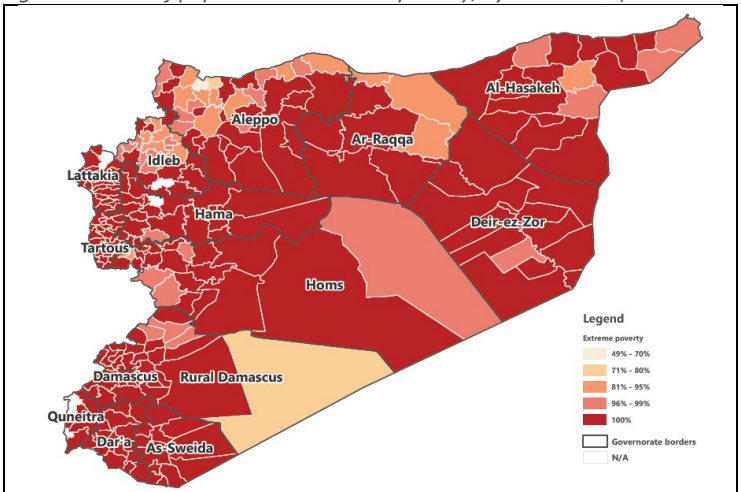
The HNAP Demographic and WASH survey is a large-scale survey aimed at providing national and sub-national-level estimates of demographic and basic socio-economic conditions of the population living inside Syria (resident, IDPs and returnees). The survey is primarily used to inform the programming of assistance of various UN agencies and humanitarian actors. The questionnaires of this survey have evolved over time.[12] In 2021, in order to assess the monetary deprivation of Syrian households, a module on household income and household expenditures was included in the survey. Based on this information, *the HNAP Socio-Economic situation report of the summer 2021 estimated that 98 percent of the Syrian population was living in extreme poverty* (Figure 2). The poverty measure is obtained by taking the sum of all individual and household incomes obtained from employment only, converting it in per capita terms using household size, and then assessing whether this welfare indicator is below $1.90, a value converted in local currency using the exchange rate at the time of the survey.

[10] The HNAP network presently consists of more than 30,000 community focal points and 475 full time staff on the ground in Syria. HNAP is implemented through local Syrian NGOs, with technical support from UN agencies. Information is collected across all regions inside Syria through face-to-face consultations and direct field observations. See Annex 2 for details.

[11] Stratified random sampling is used to draw a 95% confidence / 10% margin of error sample at the subdistrict level and the number of household interviews per community (p-coded location) within a subdistrict was obtained by randomly sampling locations proportionate to population size, with replacement.

[12] The main survey modules include questions on demographic characteristics of current household members and of members who have left the household, individual level basic information on labor market engagement (adult population) and school attendance (children below age 18); household level information on shelter, WASH, access to assistance, sources of income, copying strategies and priority needs.

Figure 2: Share of population in extreme poverty, by subdistrict (HNAP extreme poverty definition)



Source: HNAP (2021) – Summer 2021 Report Series – Socio Economic situation

The HNAP approach to estimate monetary poverty suffers from two evident methodological shortfalls: one related to the measure of welfare and one related to the poverty line definition, both of which result in a major over-estimation of extreme poverty.

2.2.1 Measure of welfare used in HNAP analysis

One of the key principles in poverty measurement is that the welfare measure should be *comprehensive*.[13] Welfare measurement is typically based on consumption expenditure or (especially in high income countries) on income. If the welfare aggregate is constructed based on income, the comprehensiveness principle requires that *all household income receipts* available for consumption – with the sole exception of one-off windfall gains – should be included, whether monetary or in-kind.[14] By including only monetary income sources from employment, the welfare measure used by HNAP to estimate poverty grossly over-estimates poverty. In fact, as shown in Figure 3, employment income only accounts for 80 percent of monetary income available to Syrian households, with significant variation by governorate.

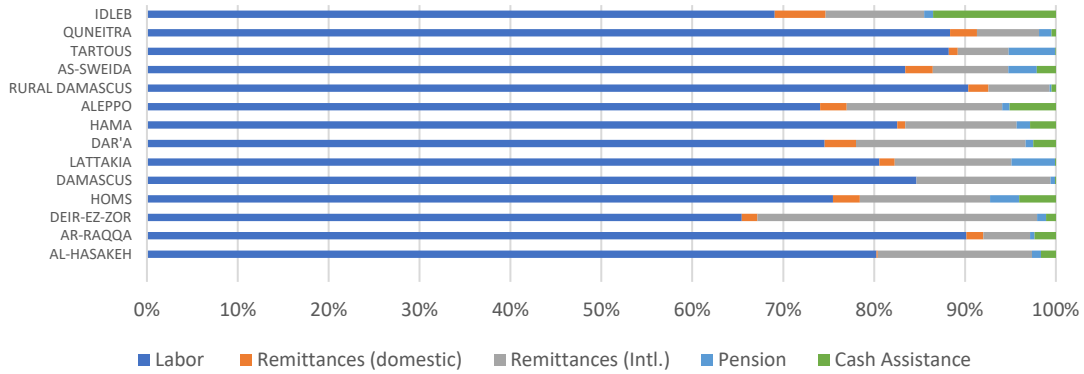
Unfortunately, the HNAP questionnaire does not capture non-monetary income that is income for consumption obtained in kind from either assistance or own production (for example the monetary income equivalent of work in agriculture resulting in own-consumption). This would imply that even constructing an income aggregate which includes – in addition to income from employment – also income from remittances (internal and international) from pensions and from assistance, the poverty estimates would likely be biased. An indication in this regard is provided by the joint analysis of income and households' self-reported income sufficiency by governorate. In principle, one could expect that – after

[13] Mancini, Vecchi (2022).

[14] *"Household income consists of all receipts whether monetary or in kind (goods and services) that are received by the household or by individual members of the household at annual or more frequent intervals but excludes windfall gains and other such irregular and typically one-time receipts. Household income receipts are available for current consumption and do not reduce the net worth of the household through a reduction of its cash, the disposal of its other financial or non-financial assets or an increase in its liabilities."* UNECE 2011: 9-11

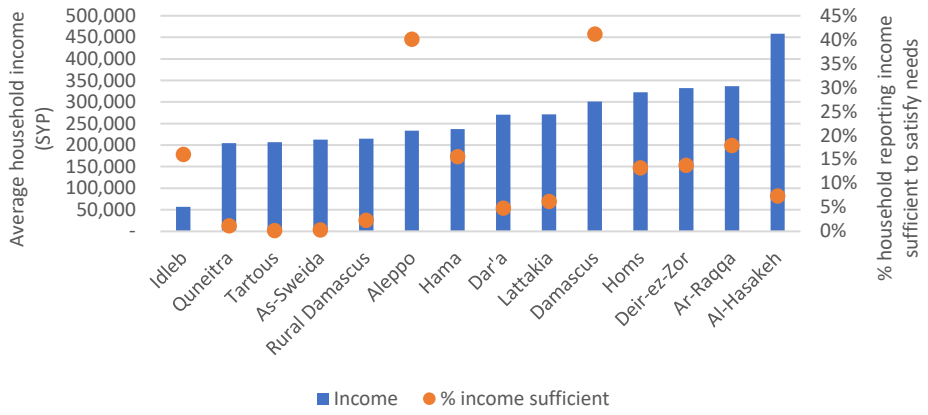
controlling for spatial price variation[15] – governorates in which income levels are lower would have a relatively lower incidence of households reporting that their income is sufficient to satisfy needs. On the other hand, as shown in Figure 4, while average household income is by far the lowest in Idleb governorate, the share of households in Idleb that report income being sufficient to satisfy household needs is the third highest after Damascus, Aleppo and Ar-Raqqa. This finding, coupled with background information of high levels of both cash and in-kind humanitarian assistance being provided to households in Idleb underscore the limitations of a partial welfare metric not comprehensive of in-kind income receipts.

Figure 3: Contribution to total household monetary income, by source



Source: World Bank staff calculations, based on HNAP June2021 Demographic and WASH survey data

Figure 4: Average household income and share of households reporting income sufficiency, by governorate



Source: World Bank staff calculations, based on HNAP June2021 Demographic and WASH survey data

Overall, the fact that the income metric used in the HNAP report is solely based on labor income and that it does not include in-kind income receipts leads to the conclusion that the 98 percent extreme poverty estimate is significantly over-estimated.

[15] Due to data limitation, a basic food spatial deflator was constructed using the cost of the WFP basic food basket at the governorate level.

2.2.2 Poverty line used in HNAP analysis

Another source of poverty over-estimation in the HNAP report's methodology is related to the definition of the poverty line. The poverty line used in HNAP analysis is $1.90, converted in local currency using the 1USD: 3200 SYP exchange rate prevailing at the time of the survey. This approach implies a poverty line of 6,080 SYP per person per day.

Despite the fact that the report uses the "extreme poverty" terminology – the approach deviates substantially from the one that underlines extreme poverty estimation. The $1.90 extreme poverty line in fact is defined in 2011 PPPs terms.[16] Used as a benchmark to compare poverty across low income countries and to obtain global poverty estimates, the $1.90 value is obtained as an average of LIC national poverty lines, all expressed in PPP values. The correct approach for using the $1.90 international poverty line corresponding to extreme poverty should have been to first use 2011 PPP value[17] to convert 1.90 US dollars in local currency (SYP) and then express it in 2021 prices using CPI inflation over the 2011-2021 period. Following the correct approach leads to a 2021 value of the $1.90 2011 PPP extreme poverty line of 1,537,153 SYP per person per day, which would be approximately one-fourth the value of the poverty line used in the HNAP report. The incorrect use of the international poverty line implies that the 98 percent extreme poverty estimation provided in the HNAP report is grossly over-estimated.

3 Poverty estimation using the HNAP 2022 Demographic and WASH Household Survey

The analysis of data from the HNAP 2021 Demographic and WASH survey revealed severe limitations in the design of both the household income and expenditure module which limit the possibility to use these data for poverty measurement.[18] In particular, both income and expenditure modules fail to capture the value of in-kind assistance and the value of household own production in agriculture. In-kind assistance and own-production of food are likely to be sizeable in Syria, particularly in areas most affected by conflict where markets are disrupted and incidence of humanitarian assistance more consistent. As a result, welfare aggregates based on either income or expenditure provide a very poor proxy of welfare that does not allow to consistently rank households from poorest to richest.

Based on the analysis of the HNAP 2021 Demographic and WASH survey, the team collaborated with the HNAP team to improve the design of the instruments for the 2022 summer round of the survey. Results of this engagement are described in the sections below.

[16] Purchasing power parities (PPPs) are used in global poverty estimation to adjust for price differences across countries. PPPs are price indices published by the International Comparison Program (ICP) that measure how much it costs to purchase a basket of goods and services in one country compared to how much it costs to purchase the same basket of goods and services in a reference country, typically the United States. PPP conversion factors are preferred to market exchange rates for the measurement of global poverty because the latter overestimate poverty in developing countries, where non-tradable services are relatively cheap (a phenomenon known as the Balassa-Samuelson-Penn effect). The ICP updates PPP data periodically. For example, in the last three ICP rounds, PPPs were released for the 2005, 2011 and 2017 reference years. The 2017 PPPs are currently used to convert household welfare aggregates, expressed in local currency units in 2017 prices, into a common internationally comparable currency unit.

[17] The revised 2011 PPP value for Syria is 22.26 (see Jolliffe et al. 2022, Table B.3).

[18] See Section 2.2.1.

3.1 Improvements to the survey's expenditure module

In lower income countries, a welfare metric based on consumption is generally preferred to income. As discussed in Mancini, Vecchi (2020), the choice between consumption and income would be inconsequential whenever all income is consumed, and all consumption is financed by income. However, in low-income economies and in contexts characterized by shocks, a metric of welfare based on consumption – which is smoother than income through households' reliance on savings and borrowing – provides a better measure of living standards.

In order to make the Demographic and WASH survey better suited for poverty measurement, efforts were made to improve the design of the expenditure module of the survey questionnaire within the limits in terms of overall questionnaire length and complexity deemed feasible by the HNAP team.

In particular, efforts were made to improve the measurement of in-kind assistance and own-production (particularly for food); to use an annual recall period for items consumed infrequently; to expand (to the extent possible) the list of non-food items (Table 4).

Table 4: Expenditure module of the 2021 and (revised) 2022 Demographic and WASH survey

SUMMER 2021 EXPENDITURE MODULE	REVISED SUMMER 2022 EXPENDITURE MODULE
*How much did your household spend on the following items on a monthly basis? **(average of last 3 months)***	*Please estimate the value of **monthly** household consumption for the following items.*
Food	Food and beverages (*bought or bartered*) Food and beverages (*own produced or received*)
Electricity	Electricity
Cooking	Fuel for cooking
Heating/cooling	Heating/cooling
Safe water	Water
Hygiene items	Hygiene items
Transportation (public/private all costs)	Transportation (public/private all costs)
Communication	Communication
Covid related items	--
	Personal care
	Infant care (diapers, baby formula)
	Childcare
	Other
	*Please estimate the value of **annual** household consumption for the following items.*
Shelter maintenance	Regular shelter maintenance
	Furnishings and household consumables (e.g. lightbulbs…)
	Clothing and footwear (*bought or bartered or received*)
Education	Education
Healthcare (including medicines, visit to healthcare facilities, medical procedures)	Healthcare (including medicines, visit to healthcare facilities, medical procedures)
NFIs	NFIs (blankets, mats, kitchenware) (*bought or bartered or received*)
Repair and maintenance of hh appliances and machines	Repair and maintenance of hh appliances and machines
	Desludging
	Other

A validation exercise which is typically conducted to check the overall quality of a welfare measure based on consumption expenditure is to rank households based on such metric and then check whether Engel's Law is satisfied, i.e. check if poorer household devote a higher share of total consumption to food.[19] As shown in Table 5 below, the expected negative relation between food shares and total household expenditure is only confirmed in 2022 data, possibly suggesting that the changes apported to the questionnaires improved the correspondence between the measure of welfare based on expenditure and households' living conditions.

Table 5: Analysis of relation between food share and total household expenditure

Dependent variable: share of total consumption devoted to food		
	2021 data	**2022 data**
(Log) Total monthly expenditure	0.0253	-0.0205
	(13.51)	(-13.15)
Household size	-0.002	0.0014
	(-2.75)	(2.38)
Nr. Observations	23166	26074
R^2	0.0079	0.0068

Note: Model include a constant term
Source: World Bank staff calculations, based on HNAP 2021 and 2022 summer round of the Demographic and WASH survey

Despite such improvements, the measure of consumption based on the 2022 Demographic and WASH survey is still far from being an accurate welfare metric for poverty estimation in Syria, particularly for the purpose of assessing the evolution of poverty over time using pre-conflict estimates from the HIES as a baseline.

In fact, the consumption module in each of the three rounds of HIES conducted prior to the conflict in 2003, 2007 and 2009 was based on an extensive diary account of household expenditures covering more than 500 items (goods and services). According to Beegle and others (2012), use of diary versus recall, and differences in the number of consumption items collected in surveys drastically affect poverty and inequality measures.

3.2 Monetary poverty estimates based on the HNAP 2022 Demographic and WASH survey

While differences in survey instruments between the HNAP 2022 and the HIES constrain the possibility of obtaining accurate pre-post conflict poverty comparisons, it is important to assess whether poverty estimates from the HNAP 2022 can be used to assess the profile of monetary poverty in Syria in 2022.

The welfare metric used for poverty analysis is constructed aggregating all available information on household expenditure, with the sole exclusions of expenditures recorded under the "Other" categories for both monthly and annual consumption items (see Table 4). Compared to a "standard" consumption aggregate for welfare measurement, the consumption aggregate based on information collected in the HNAP 2022 has three major drawbacks:

[19] Engel's law – the fact that the expenditure share dedicated to food consumption decreases as income rises – has been proved to be extraordinarily consistent across time and space. As such, the predictive character of this relationship has been widely used in poverty measurement, from the estimation of poverty lines to PPP assessment.

(i) The list of consumption items included in the questionnaires is mostly consistent with major headings in COICOP classification (2 digit), with the sole omission of expenditure on "alcoholic beverages and tobacco" and "recreation and culture".[20] However, in some cases the list of consumption items in the HNAP 2022 questionnaire includes items at lower levels of aggregation, including some coarse expenditure headings open to interpretation by respondents (for example: personal care, childcare, NFIs…).

(ii) No information is available to properly account for housing costs. Information on expenditure on rent paid is available for market tenants, which only constitute 10 percent of households, a sample to small and geographically segregated to attempt estimating any model to impute for the value of housing services consumed by owners or other non-market tenants.

(iii) No information is available on consumer durables possessed by the household.

Another important challenge that needs to be addressed to estimate monetary poverty, is to control for spatial price differences. Unfortunately, CBS does not produce any subnational CPI index and lacking detailed information on food and non-food consumption items, it is not possible to estimate one using HNAP survey data. A possible approach is to use a proxy food price index constructed using "standard food basket" price estimates at the governorate level produced by WFP (Table 6). In Syria, WFP standard food basket is set at a group of dry goods providing 2,060 kcal a day for a family of five during a month. The basket includes 37 kg bread, 19 kg rice, 19 kg lentils, 5 kg of sugar, and 7 liters of vegetable oil. WFP provides governorate level estimates on such basket in its monthly "market price watch bulletin", building on market level price information it has been collecting in the country since 2011.

Table 6: Spatial price deflator based on WFP Standard Food Basket (SFB)

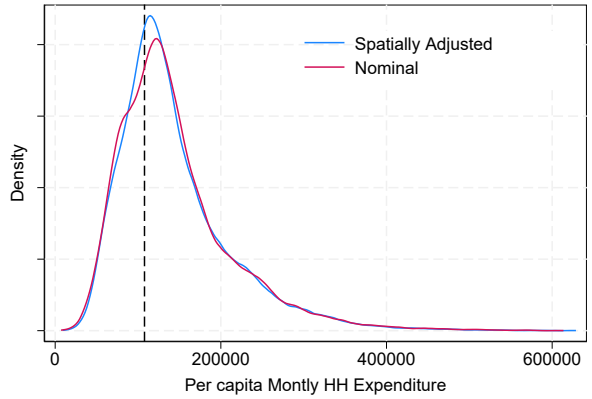
	Standard food basket price (SYP)	Spatial price deflator
Damascus	342,867	106.2
Aleppo	310,336	96.1
Rural Damascus	340,465	105.4
Homs	318,922	98.8
Hama	334,474	103.6
Lattakia	355,953	110.2
Idleb	322,260	99.8
Al-Hasakeh	253,223	78.4
Deir-ez-Zor	273,609	84.7
Tartous	346,070	107.2
Ar-Raqqa	290,455	90.0
Dar'a	352,944	109.3
As-Sweida	347,134	107.5
Quneitra	341,690	105.8
National*	322961.6	100.0

Notes: National average weighted by population

Source: World Bank calculation using April 2022 market price watch bulletin and HNAP population estimates

[20] The Classification of individual consumption by purpose, abbreviated as COICOP, is a classification developed by the United Nations Statistics Division to classify and analyze individual consumption expenditures incurred by households, non-profit institutions serving households and general government according to their purpose. The classification is generally used by countries in NA estimations and budget surveys, particularly in relation to CPI weights estimation.

Figure 5: Distribution of monthly per capita expenditure, nominal and spatially adjusted



Notes: The vertical line indicates the monthly value of the $2.15 poverty line (2017 PPP)
Source: World Bank staff calculations, based on HNAP summer 2022 Demographic and WASH survey

As shown in Figure 5, the spatially adjusted and unadjusted (nominal) welfare metrics display a very similar distribution, although the spatially adjusted one is relatively more concentrated. Table 7 below reports national level poverty estimates at LIC $2.15 (2017 PPPP) as well as LMIC $3.65 (2017 PPP) international poverty lines based on the two welfare metrics.

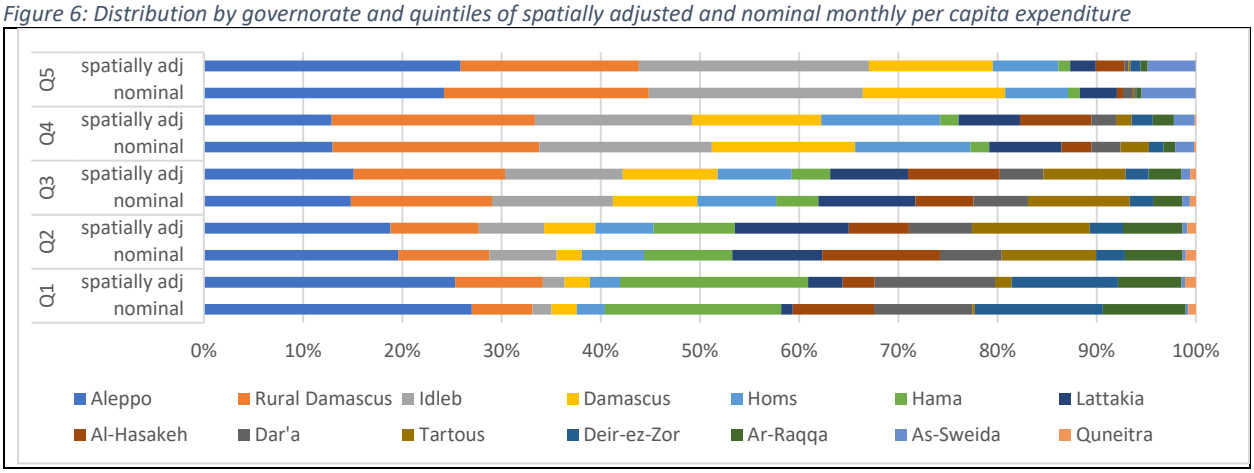
Table 7: National poverty estimates based on nominal and spatially adjusted welfare

	Nominal	Spatially Adjusted
$2.15 2017 PPP	26.92	25.62
	(0.008)	(0.008)
$3.65 2017 PPP	69.34	70.41
	(0.011)	(0.001)

Note: Standard errors in parenthesis
Source: World Bank staff calculations, based on HNAP summer 2022 Demographic and WASH survey

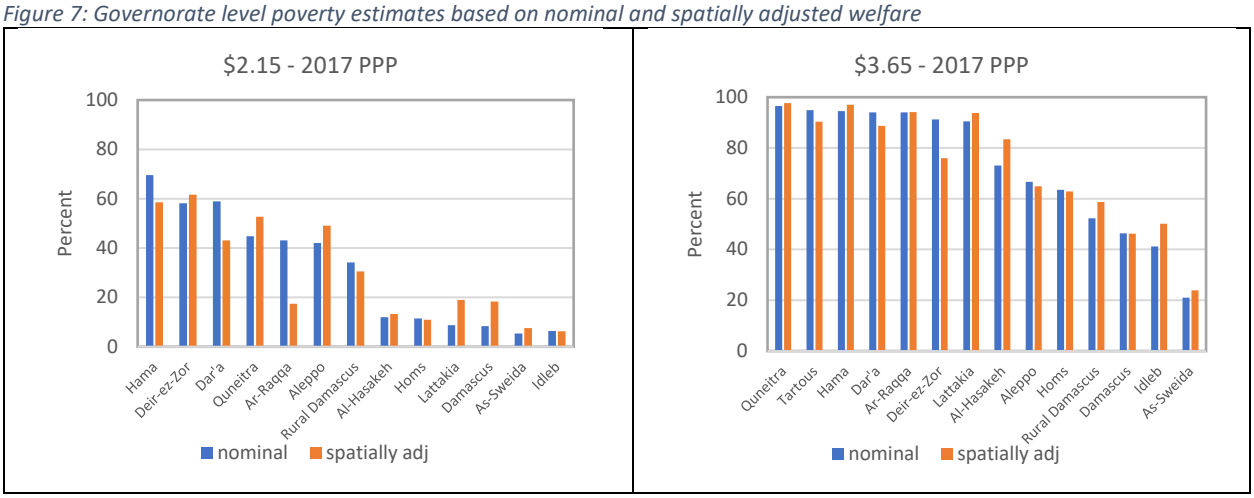
As shown in Figure 6, the distribution by governorate and the welfare quintiles constructed on each of the two welfare metrics are substantially different, with clear implications in terms of poverty profile (Figure 7).

Figure 6: Distribution by governorate and quintiles of spatially adjusted and nominal monthly per capita expenditure



Source: World Bank staff calculations, based on HNAP May 2022 Demographic and WASH survey

Figure 7: Governorate level poverty estimates based on nominal and spatially adjusted welfare

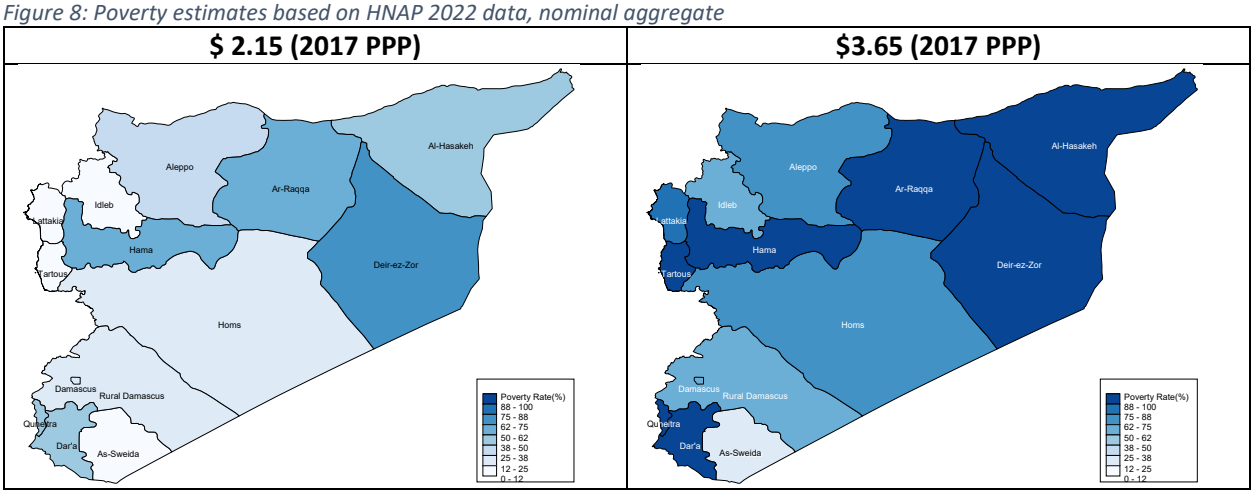


Source: World Bank staff calculations, based on HNAP summer 2022 Demographic and WASH survey

Overall, while acknowledging the importance of controlling for spatial price differences, we do not think that using an imperfect spatial deflator would be the best way forward, particularly when considering how much a fixed basket approach would deviate from the theoretical underpinnings of welfare measurement. Moreover, using a nominal aggregate could also be aligned with the impossibility to account for spatial price differences in pre-conflict poverty estimates based on 2009 grouped data.

Figure 8 below maps poverty at the governorate level, using the nominal aggregate.

Figure 8: Poverty estimates based on HNAP 2022 data, nominal aggregate



Source: World Bank staff calculations, based on HNAP summer 2022 Demographic and WASH survey

4 Nowcasting monetary poverty in Syria: Challenges and sensitivity analysis

4.1 Data challenges

As discussed in Section 2.1, national accounts – the comprehensive economic statistics that measure economic activity in a country – become an input for poverty projections for years in which no survey has been conducted. The typical (distribution neutral) approach applies per capita growth rates of GDP or private consumption (household final consumption expenditure in WDI) to the baseline mean of per capita expenditure from a household survey to extrapolate poverty beyond the survey period. Besides concerns pertaining the validity of the assumption that each household's consumption expands/contracts at the same rate of the overall economy, the reliability of NA statistics can pose further challenges. In the case of Syria, *the base year for NA estimation is 2000*. Hence, NA statistics published by the national statistical agency available up to 2021 assume that the structure of the economy has not changed since 2000, an assumption clearly problematic given the substantial economic changes associated to economic liberalization between 2000 and 2010 and conflict thereafter.[21]

In what follows, we discuss possible options for the use of NA statistics in poverty projections taking into account the challenges posed by data quality and data reliability issues in the context of Syria.

4.1.1 Measuring "growth"

Should poverty projections be based on GDP or private consumption data from national accounts? Private consumption is generally preferred as it captures a set of goods and services that more closely mirrors consumption from household surveys. In practice however, considerations such as the availability and quality of GDP and private consumption data, as well as the strength of correlations between data from national accounts and household survey data typically influence the choice.

Prior to conflict, for the years in which both NA and survey data are available, the average ratio of average per capita consumption from household survey to average private consumption per capita from NA was 0.93, whereas the corresponding ratio using GDP per capita was 0.61 (Table 8).[22]

Table 8:Ratio of survey household consumption to Private Consumption and GDP

	Ratio of average pc consumption from HH survey to average pc private consumption from NA	Ratio of average pc consumption from HH survey to pc GDP
2003	1.18	0.71
2007	0.84	0.56
2009	0.79	0.57
Average	0.93	0.61

Source: World Bank staff calculations, based on WDI and CBS data

[21] The international recommendation is to update the base year at least every five years.
[22] The lower ratio when using GDP is expected because GDP includes more than private household consumption.

While NA estimates of average PC private consumption are closer to those in household survey compared to per capita GDP, the result are reversed when looking at growth rates. From 2003 to 2009, the average annual growth of per capita GDP was 1.6 percent, which closely aligns with the 2 percent estimated from household surveys (Table 9).

Table 9: Average annual growth rate 2003-2009

	Average Growth		
	2003-2009	**2003-2007**	**2007-2009**
Per capita Consumption from household surveys	-0.2%	-0.7%	0.4%
Per capita GDP	1.6%	1.8%	1.3%
Per capita Private consumption from NA	3.4%	2.0%	5.6%

Source: World Bank staff calculations, based on WDI and CBS data

Pre-conflict data already revealed a substantial discrepancy between the growth-rate of per-capita welfare estimates based on NA private consumption and those coming from household surveys.[23] Over time, such discrepancy is expected to have further increased together with the deteriorating capacity of NA aggregates to reflect changes in the economy as a result of conflict. In particular, the likely increase of the informal economy as a result of conflict might have created an additional source of measurement error in available NA indicators. In principle, it could be assumed that an increase in informality would affect measurement error of GDP more compared to household final expenditure. However, as household final consumption expenditure in Syria's NA is computed as a residual,[24] it could be assumed that the loss in reliability of growth estimates based on this aggregate is more severe than that based on GDP growth estimates. [25]

Another important choice when identifying the growth rate in the per capita NA indicator to be used for poverty projections pertains the choice of the deflator. The general practice is to work with per capita NA aggregates expressed in constant terms using the GDP deflator, an implicit deflator that is meant to reflect price changes in goods and services purchased by consumers, businesses, government and foreigners (not importers). On the other hand, when assessing changes in consumption between household surveys collected at different points in time, the typical choice is that of using the Consumer Price Index (CPI), which measures the price changes in goods and services purchased by consumers (households). CPI is also used when expressing PPP conversion factors from 2011 or 2017 base years into the corresponding values in the years in which survey data are available for global poverty measurement. As shown in Figure 9, the GDP deflator and CPI trends, while generally aligned before conflict, diverge post 2011, possibly reflecting

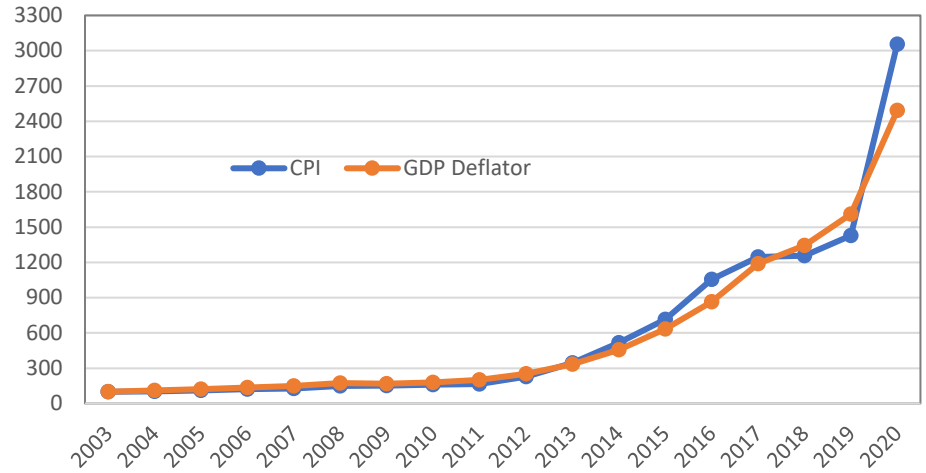
[23] El-Laithy, Aby-Ismail (2005).

[24] Ibid.

[25] Another element of concern regarding the reliability of Household and NPISHs Final Consumption Expenditure (HFCE) from NA pertains the lack of information on how its constant price estimates are computed by CBS. In fact, while GDP constant price estimates provided by CBS and included in WDI can be replicated using the GDP series in current prices and deflating it using the GDP deflator, the same does not hold in the case of HFCE. In fact, the constant price HFCE series provided by CBS and included in WDI cannot be replicated starting from the corresponding series in current prices neither using the GDP deflator (as it should) nor using the CPI. As CBS does not publish any documentation on the construction of the constant price HFCE series, the reliability of the metric is questionable.

the combined effect of the collapse in domestic production, sanctions, devaluation and increasing reliance on imports of basic commodities.

Figure 9: GDP deflator and CPI growth index (2003=100)



Source: WB staff calculations based on WDI and CBS

Based on these considerations, the most appropriate approach to project welfare growth would be to use per capita GDP in local currency units deflated using the CPI.[26]

4.1.2 Population estimates

Data challenges also affect population estimates, which are needed to convert macro aggregates in per capita terms.

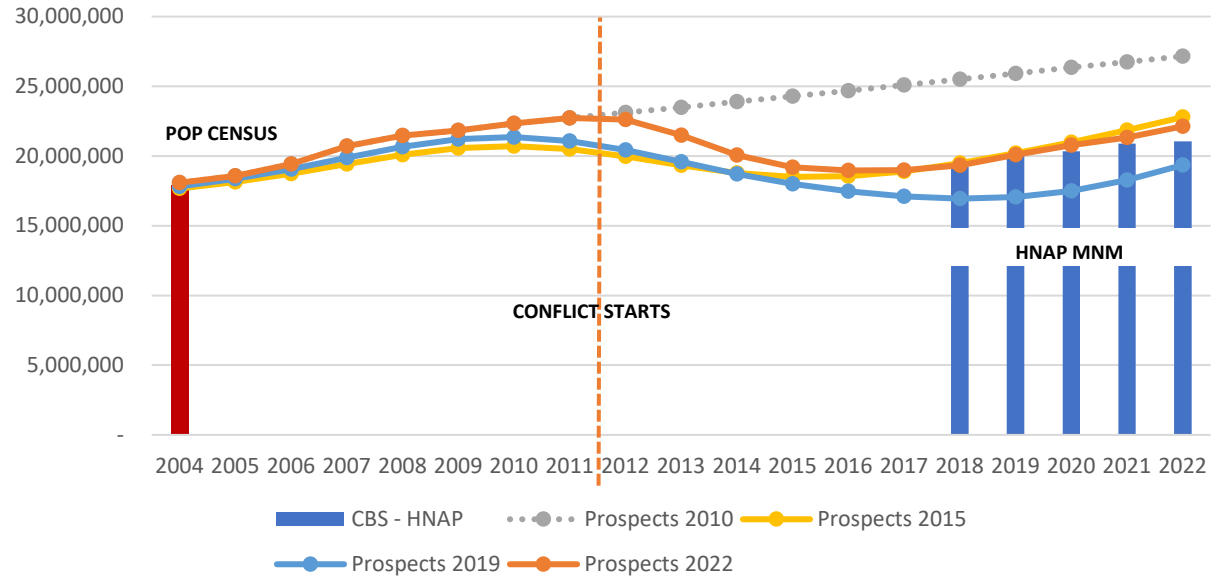
The last population Census in Syria was conducted in 2004. Since then, population estimates for Syria have been revised multiple times. Pre-conflict population estimates and projections to account for the tremendous impact of conflict which claimed the lives of at least 350,209 individuals[27] and forced millions of Syrians to leave the country.[28] As shown in Figure 10, sizeable differences exist between different revisions of Population Prospects data post conflict. In particular, the latest available estimates from the 2022 Prospects revision – which have been recently adopted in WDI – place the Syrian population for 2022 at about 22 million, in line with direct population counts from HNAP and with the 2015 Prospects revision, but as much as 15 percent higher compared to the 2019 Prospects revision. Moreover, while population estimates for most recent years are relatively similar between the 2015 and 2022 population prospects revisions, major differences emerge for the years between 2009 and 2015.

[26] See Section 4.2 and Section 5 for further discussion.

[27] Estimates of the total death toll of the Syrian war vary depending on the methodology and reporting agency. In 2021, the UN's High Commissioner for Human Rights (OHCHR) office released a tally of 350,200 deaths including both civilians and combatants. The count is based on a strict methodology requiring the deceased full name, date of death and location of the body and should therefore be interpreted as an under-estimation of the actual number of was related deaths. The Syrian Observatory for Human Rights (SOHR) estimates an overall death toll of 610,000 people over 11 years of conflict, of which 160,681 are represented by civilians (120,158 men, 15,237 women and 25,286 children).

[28] 5.6 million Syrian refugees are currently hosted in neighboring countries and an additional 1 million reside in Europe, mostly in Germany and Sweden (UNHCR).

Figure 10: Population estimates for Syria



Source: WB staff calculations based on World Population Prospects (UNDESA), HNAP and CBS
Note: Population projections based on medium fertility scenario

Population data from the 2022 revision of the World Population Prospects (which is included in WDI) will be used for the poverty projections.[29]

4.2 Distribution neutral poverty projections: Sensitivity analysis

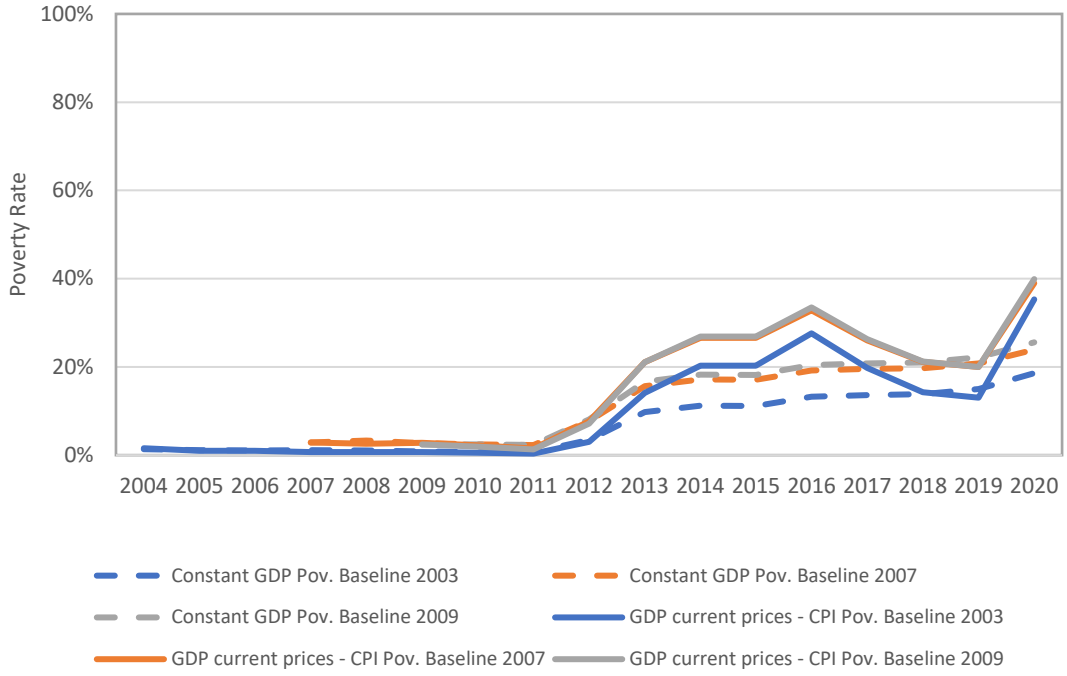
This section presents the results of distribution neutral poverty projections for Syria. As the country was re-classified as low-income country in 2018, estimates have been computed using both the lower-middle-income countries international poverty line ($3.65 in 2017 PPP) and low-income countries international poverty line ($2.15 in 2017 PPP).

For an analysis of the sensitivity of poverty projections to underlying assumptions, we present results obtained using baseline poverty estimates from all years available (2003, 2007 and 2009); growth estimates based on per capita GDP in constant terms and per capita GDP in current LCU adjusted using CPI; and using either a unit pass-through or a "conflict-adjusted" pass through (Box 2).[30]

Figure 11 show poverty projections results at the Lower income countries international poverty line (in 2017 PPP), using different poverty baselines and different NA aggregate growth with a unitary pass through. Figure 12 displays a comparable analysis at the Lower Middle Income countries international poverty line.[31]

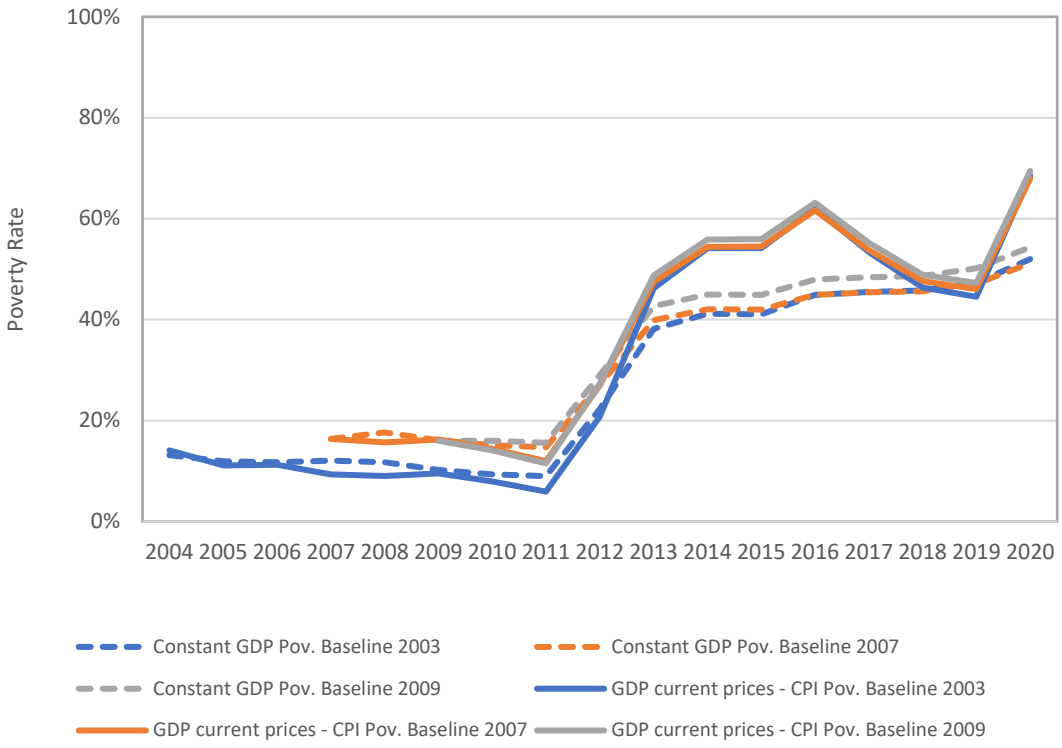
[29] Additional analysis was further conducted to contrast national poverty estimates provided in the 2022 revision of the Population Prospects with different geospatial population estimates. Results of this analysis are discussed in Annex 3.
[30] Corresponding estimates obtained using private per capita consumption from NA are provided in Annex 4.
[31] Corresponding estimates obtained using poverty lines in 2011 PPP ($3.2 and $2.15) are provided in Annex 5.

Figure 11: Sensitivity Analysis of Poverty Projections at LIC extreme poverty line ($2.15, 2017 PPP)



Source: World Bank staff calculations, based on WDI and CBS data

Figure 12: Sensitivity Analysis of Poverty at LMIC international poverty line ($3.65, 2017 PPP)



Source: World Bank staff calculations, based on WDI and CBS data

Irrespective of the growth, poverty projections show sizeable differences depending on the baseline year used: 2003, 2007 and 2009. In particular, estimates based on the latest HIES 2009 deliver consistently higher levels of poverty projections. This finding is not surprising however, as none of the projection approaches is able to match actual pre-conflict poverty dynamics (Table 10). *Accordingly, to make best use of pre-conflict data, preferred poverty projections should be based on HIES 2009 baseline poverty estimates*.

Table 10: Comparison between baseline poverty estimates and projections in 2009

	Poverty line[32]	Poverty estimates based on grouped data from HIES 2009	Distribution neutral poverty projections baseline 2003	Distribution neutral poverty projections baseline 2007
Constant pc GDP	$2.15	2.4%	0.9%	2.7%
Current pc GDP & CPI	$2.15	2.4%	0.7%	2.8%
Constant pc GDP	$3.65	16.0%	10.2%	16.1%
Current pc GDP & CPI	$3.65	16.0%	9.5%	16.3%

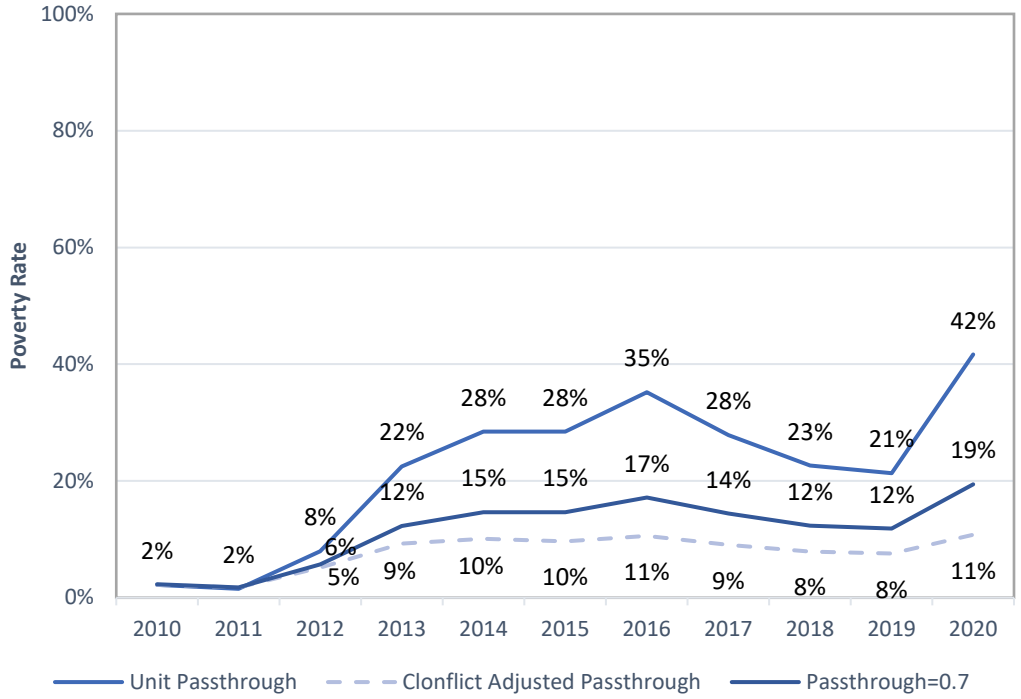
Source: World Bank staff calculations, based on WDI and CBS data

The analysis further reveals the substantial sensitivity of results to the choice of the NA aggregate growth to be used in the projections, with poverty projections based on the growth rate of constant per capita GDP being sizably different compared to those in which growth is estimated using per capita GDP in current prices (LCU) deflated using CPI. In particular, the while projections based on growth in constant pc GDP show a monotonic increase in poverty over the period 2011-2020, projections based on current pc GDP deflated using CPI show a marked increase in poverty between 2011-2016 – which corresponds to the most intense phase of the Syrian conflict – a decline in poverty between 2016 and 2019 – which correspond to a subdued phase of the conflict and pick up again post 2019, reflecting the compounding impact of the Lebanon financial crisis. *Based on considerations related to the reliability of constant GDP estimates[33] and a better match with observational accounts regarding the evolution of welfare in Syria based on non-monetary indicators, poverty projections based on current pc GDP growth deflated using CPI are preferred.*

Lastly, Figure 13 and Figure 14 show poverty projection results using preferred poverty baseline (HIES 2009) and growth estimates (per capita GDP in current prices, deflated with CPI) at different values of the pass through: unitary, "conflict-adjusted" (which varies over the conflict years from 0.7 to 0.48 - see Box 2), as well as the pass through observed between 2007 and 2009 (0.29), a period characterized by drought and regressive welfare dynamics.[34] As expected, employing a lower pass-through rate leads to considerably lower poverty estimates possibly reflecting household capacity to smooth consumption in face of a shock. However, the possibility for households to continue smoothing their consumption over a prolonged conflict spell is dubious. Given the amount of uncertainty around the most appropriate pass-thorough rate to be used in the case of Syria, we can use the poverty projections based on different values of the pass-through as providing likely lower and upper bounds for the extent of poverty in the country.

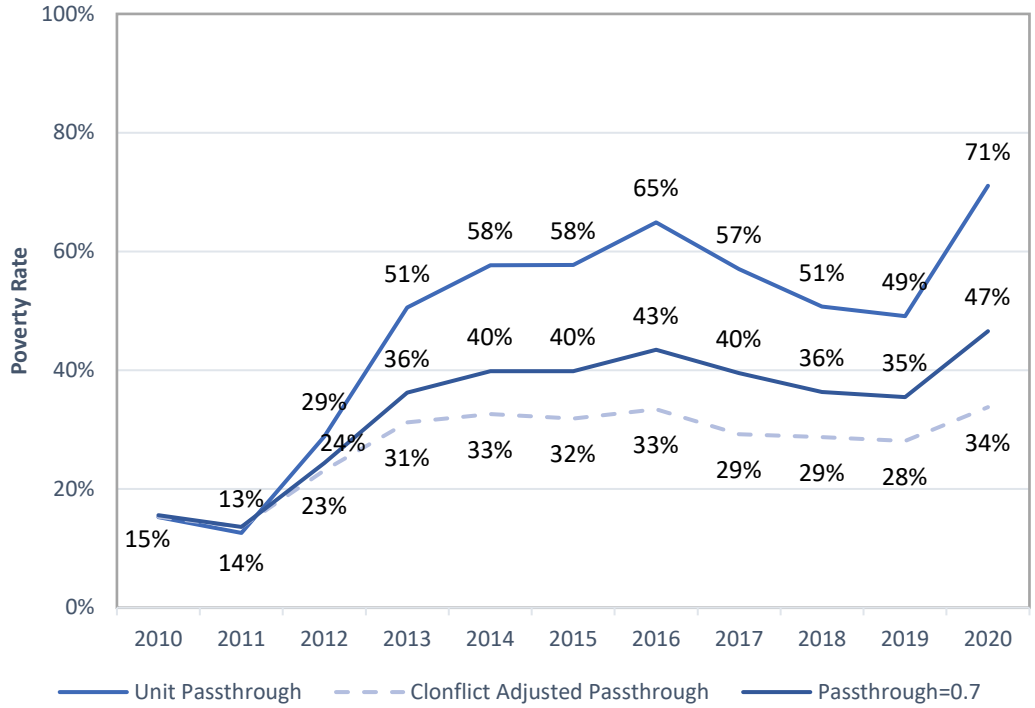
[32] Corresponding estimates obtained using poverty lines in 2011 PPP ($3.2 and $2.15) are provided in Annex 5.
[33] See section 4.1.1.
[34] Corresponding estimates obtained using poverty lines in 2011 PPP ($3.2 and $2.15) are provided in Annex 5.

Figure 13: Poverty Projections at LIC extreme poverty line ($2.15, 2017 PPP) and growth based on GDP current prices (CPI adjusted) and 2009 poverty baseline using different passthrough rates



Source: World Bank staff calculations, based on WDI and CBS data

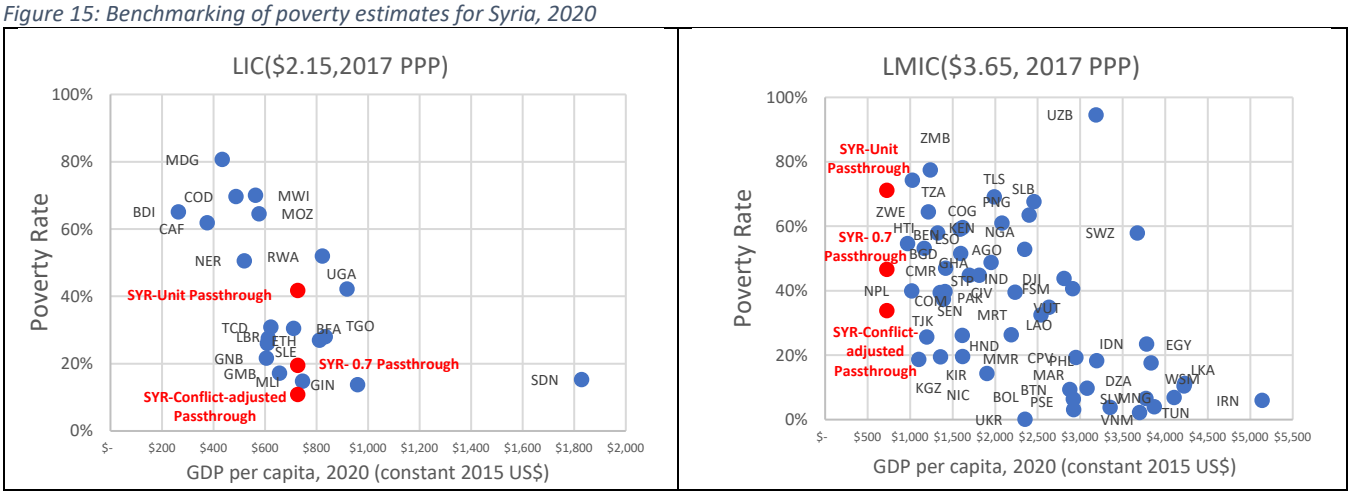
Figure 14: Poverty Projections at LMIC international poverty line ($3.65, 2017 PPP) and growth based on GDP current prices (CPI adjusted) and 2009 poverty baseline using different passthrough rates



Source: World Bank staff calculations, based on WDI and CBS data

Figure 15 below benchmarks poverty estimates for Syria obtained using the distribution neutral approach based on GDP current priced adjusted by CPI and baseline 2009. Overall, estimates based on both unit value pass through and conflict adjusted pass through lead to estimates that could be consistent with countries at similar levels of development, as proxied by per capita GDP at current prices.

Figure 15: Benchmarking of poverty estimates for Syria, 2020



Source: World Bank staff calculations, based on WDI and CBS data

5 Triangulating poverty projections with available evidence

As discussed in Section 3, the HNAP 2022 survey could provide a reasonably good assessment of the current extent of monetary poverty in Syria. While the consumption aggregate based on the HNAP 2022 survey is not comparable with the comprehensive recording of consumption from pre-conflict official household budget surveys, it is most likely providing a more accurate characterization of monetary poverty in Syria compared to projections based on a distribution neutral nowcasting approach, including on the subnational profile of monetary poverty. Using the nominal consumption aggregate obtained from the HNAP 2022, monetary poverty in Syria is the highest in northeastern governorates (Figure 8). Can this evidence be corroborated?

Similarly, as discussed in Section 4, distribution neutral approaches could lead to very different dynamics of the temporal evolution of poverty, depending on the underlying NA aggregate used to project growth in average household consumption. Based on the assessment of the likely quality of each aggregate, estimates of growth based on per capita GDP in current prices deflated using the CPI should be preferred over the default nowcasting estimates obtained using constant prices per capita GDP. As shown in Figure 11 and Figure 12, poverty trends based on per capita GDP in constant prices would lead to a monotonic poverty increase over the conflict period, whereas estimates using per capita GDP in current prices deflated with the CPI would lead to an increase in poverty over the period 2011-2016, followed by a poverty decline between 2016 and 2019, and again an increase thereafter. Can these trend dynamics be corroborated?

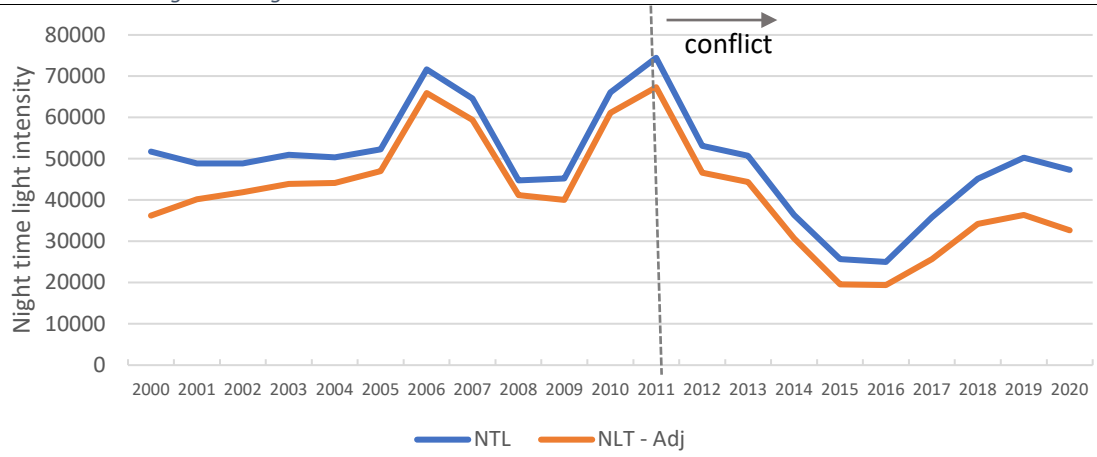
In order to answer these two questions might be useful to use georeferenced data, in particular looking at night-time light data as well as data on spatial and temporal incidence of droughts.

As shown in Figure 16, night-time light emission – a metric often used to proxy for economic activity - collapsed after the start of the conflict in 2011 and kept declining till 2016. In the following years, the rebound that followed the phase of conflict de-escalation was short lived, with emission declining again starting in 2019, the year of the financial crisis in Lebanon.[35]

Interestingly, a drop in night-time light emissions is also visible in 2008-2009, corresponding to the severe drought that affected the country prior to the conflict start. Other drought periods affected agriculture production in 2014, 2016 and 2018 possibly driving additional decline in economic activity, as captured by night-time light emissions. More recently, drought conditions affected northeastern regions of Syria in 2021 and 2022.

Overall, evidence emerging from satellite data seems to suggest that – should a distribution neutral approach be used to nowcast poverty in Syria – using projections based on GDP in current prices deflated by the CPI is likely to provide a more accurate picture of poverty dynamics compared to GDP in constant prices which would provide monotonic poverty trends over the entire conflict period.

Figure 16: Trends in night-time light emissions



Note: Night-lights data series shows in orange adjusted for intensity variations emanating from gas and oil flares.
Source: World Bank estimates based on Chen et al. (2021)

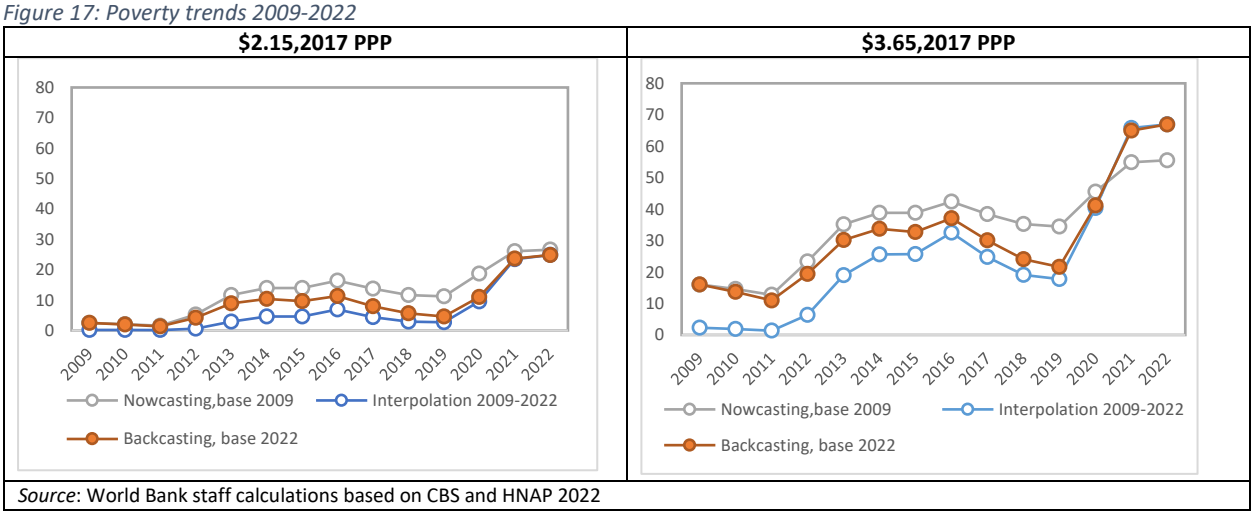
[35] In order to consistently analyze variation in night time light emissions over the period 2000-2020, we use the combined VIIRS, DMSP series. See Chen et al. 2021.

6 Proposed way forward

Estimating monetary poverty trends in Syria post 2011 is severely constrained by data quality and availability issues. Evidence presented in this paper suggests that – among possible distribution neutral nowcasting approaches – the one in which baseline poverty estimates based on 2009 grouped data and average consumption growth based on per capita GDP in current prices, deflated by the CPI, would likely lead to the most sensible trend profile of poverty over the conflict period. Moreover, given data constraints, the analysis of consumption data based on the HNAP 2022 Demographic and WASH survey does not evidence any concern regarding the possibility to use these data for the purpose of poverty measurement.

Based on these considerations, the proposed way forward is to use 2022 HNAP-based poverty estimates to anchor the most recent estimates to the best available evidence, and to interpolate the poverty evolution obtained from back-casting 2022 and nowcasting 2009 poverty estimates over the 2009-2022 period using the growth rate of per capita GDP in current prices, deflated by the CPI with a passthrough of 0.7 (Figure 17).[36]

Figure 17: Poverty trends 2009-2022



Source: World Bank staff calculations based on CBS and HNAP 2022

The proposed approach has three main advantages. First, it makes the best use of the best available evidence in a simple and transparent way, therefore substantially improving on current World Bank poverty estimates available in PIP. Second, it is grounded in the standard methodology used in PIP for the analysis of poverty trends in other countries, including in cases of non-comparability of poverty estimates between baseline and end-line surveys. Lastly, it will allow an updating of poverty estimates moving forward even in absence of new household survey rounds.

[36] See https://datanalytics.worldbank.org/PIP-Methodology/lineupestimates.html#nationalaccounts

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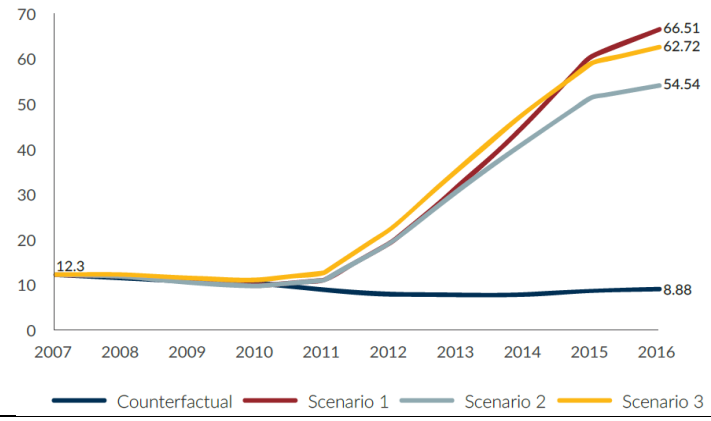
Annex 1: Post-Conflict Poverty Estimation Studies in Syria

World Bank

To date, the only publicly available poverty projections for Syria produced by the World Bank date back to 2017.[37] In this study, using a growth elasticity of poverty estimated over the period 2003-2007, poverty at the lower national poverty line (extreme poverty as per official national terminology) is projected to have increased from 12.3 percent in 2007 to around 54.5 - 66.5 percent in 2016 (a 4.4 to 5.4 fold increase), with estimates depending on assumptions regarding dynamics of consumption growth and inequality (Figure 4).

Results from this simulation exercise should be interpreted with caution. In fact, besides obvious limitations on the stability of pre-conflict distributional assumptions, poverty projections are based on a national poverty line which was estimated back in 2003, possibly anchoring poverty to a welfare standard which is likely not reflective of living conditions of Syrians 5 years into conflict. [38]

Figure A 1: Poverty projections, 2007-16. National LPL baseline, GEP approach (percent)



Notes: Scenario 1 assumes same growth elasticity of poverty as in the 2004-2007 period (-2.911), and no changes in inequality; scenario 2 assumes a decline in growth elasticity of poverty while keeping inequality unchanged, while scenario 3 allows inequality to increase at a rate of one percent a year.
Source: World Bank (2017)

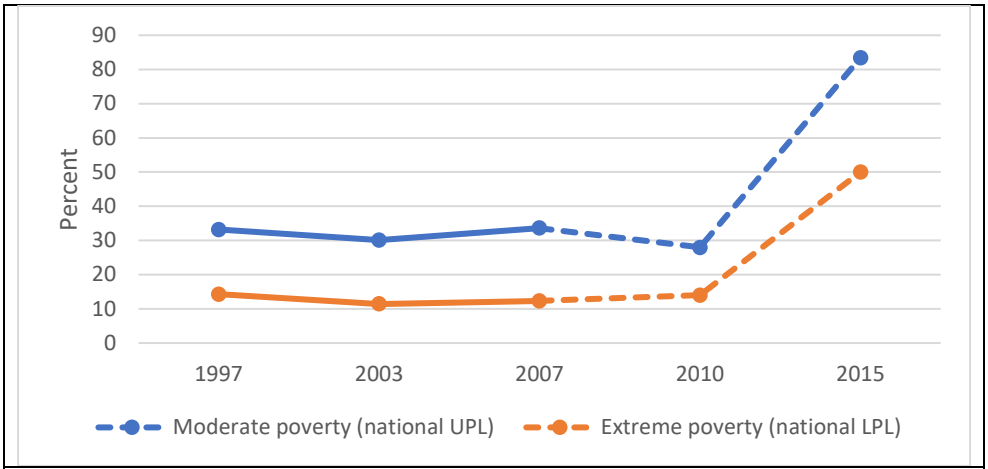
United Nations Economic and Social Commission for Western Asia (ESCWA)

ESCWA (2016) provides poverty projections over the period 2010-15, finding that poverty measured at the upper national poverty line (moderate poverty) increased from 28 to 83.4 percent, whereas poverty measured at the lower national poverty line (extreme poverty) increased from 14 to 50 percent (Figure A 2). Furthermore, the analysis reports a deepening of the poverty gap, particularly in rural areas. No

[37] World Bank (2017).
[38] It is to be noted that- given the sharp decline in GDP associated to conflict - the pre-conflict national poverty line is likely to represent a too ambitious threshold to assess poverty in post-conflict Syria. Estimates based on 2003 and 2007 data indicate that the national poverty line was close to the LMIC international poverty line, whereas due to the macroeconomic shock associated to conflict, Syria is currently classified as a low income country.

information is provided on the methodology adopted for the projections, nor on the baseline poverty figures used in the analysis.

Figure A 2: Poverty projections, 2010-15. National LPL and UPL baseline; distribution neutral approach (percent)



Notes: Dashed line refers to poverty projections, whereas solid line refers to survey estimates.
Source: ESCWA (2016) and Abu-Ismail et al. (2011)

ESCWA (2020b) provides poverty projections for Syria obtained using 2003 HIES data provided by the Poverty and Inequality Platform (PIP) . Poverty projections are based on distribution neutral projections based on the growth of private household consumption per capita, no information is provided on pass through rate.[39] Poverty projections are provided at $1.90 (2011 PPP) international poverty line and at the $3.50 (2011 PPP) poverty line – which represent the (weighted) average of national poverty lines in the region, all expressed in PPP terms. Results indicate an increase in absolute poverty from less than 1 percent in 2010 to 40 percent in 2019, whereas 77 percent of the Syrian population is projected to be living with less than $3.50 in 2019 (up from about 19 percent in 2010). Per capita expenditure is projected to have declined from $250.2 per month (2011 PPP) to $86.59 in 2019, placing welfare levels in Syria on par with that of the Republic of Yemen and other low income countries.

Academia and Research centers

Hamati (2018) uses a dynamic microsimulation model that combines macroeconomic projections with pre-crisis household survey microdata. In particular, the modeling builds on microdata from a 10 percent sample of the HIES 2009 survey, used to construct pre-conflict poverty baseline at the national official Lower and Upper poverty thresholds (LPL, UPL). The impact of conflict is modeled through a demographic shock, a labor market shock, and a price shock (baseline model – scenario A), further augmented to take into account household income changes through remittances and social assistance (scenario B).[40]

[39] ESCWA (2020a).

[40] The main assumptions employed in Hamati's model can be summarized as follows. Demographic shocks are incorporated through changes in birth, death, and migration rates, which subsequently affect labor status and income reception. To determine immigrants, refugees, and IDP numbers the model utilizes data from SCPR (2016), and assumes that families, rather than individuals, relocate to in search of a safe shelter. Income shocks are modeled by considering changes in employment status and income resources. Due to data constraints, the model assumes that changes occur only in one direction, without accounting for

Results from Scenario A suggest poverty measured at the LPL had increased from 14.9 percent in 2009 to 85.8 percent in 2015, while using the UPL, the estimated increase over the period is from 29.4 to 93.1 percent. The introduction of remittances and assistance in the model under Scenario B only partially mitigates the simulated poverty increase, with estimates indicating a poverty incidence in 2015 of 75.9 percent at the LPL and 87.5 percent at the UPL.

Annex 2: The Humanitarian Needs Assessment Programme (HNAP)

The HNAP is joint UN program established in April 2018 with the objective of tracking displacement and return movements, conduct multi-sectoral assessments, and monitor humanitarian needs inside the country.[41] The HNAP program comprises of two sets of quantitative data: one at the community level and one at the household level.

1. **Community level data** obtained from key informants reporting from a census of geo-coded inhabited communities (9,642 in 2022) in all 14 governorates of Syria. Community level data include:
    a. ***Monthly Mobility and Needs Monitoring (MNM)***. This monthly assessment relies on 475 HNAP field staff who conduct interviews through a network of 30,000 community focal points[42] to track population movements inside Syria. MNM assessment collects data for each inhabited community (villages, urban neighborhoods and camps) on human mobility dynamics and local priority needs for 3 population subgroups: returnee,[43] displaced and resident populations. Information includes the following:
        i. Mobility flows (# of individuals moving in and out of the community including information on origin (inflows) and destination (outflows);
        ii. Mobility reasons (push and pull factors - economic, security, access to basic services…)[44];
        iii. Living conditions (shelter and occupancy)

shifts in employment sectors or the emergence of new job vacancies. For scenario B, Hamati's estimates involve two key components: social assistance and remittances. The value of social assistance is determined using UNOCHA monthly reports from 2018 to calculate the average size and value of nonfood items (NFI) provided to beneficiaries, as well as the percentage of families receiving NFIs., For remittances, due to the lack of updated data, the study relies on 2009 HEIS remittances data. An assumption is made that families who received remittances in 2009 continue to receive them in 2015.

[41] The HNAP network presently consists of more than 30,000 community focal points and 475 full time staff on the ground in Syria. HNAP is implemented through local Syrian NGOs, with technical support from UN agencies. Information is collected across all regions inside Syria through face-to-face consultations and direct field observations.

[42] These community focal points include NGO/humanitarian aid workers, community-based organization leaders, community leaders, health workers, religious leaders, teachers, traders and shopkeepers, local administration, social workers and representatives of IDP/returnee communities, amongst others. The MNM data is collected through direct visits to the communities, where multiple face-to-face interviews with community focal points take place. In order to guarantee reliability of data, three focal points are separately interviewed for each community and information is confirmed if discrepancies within 5% margin. Interviews are further complemented by field teams' first-hand observations.

[43] HNAP defines returnee as an individual who has returned to his/her place of origin for at least one month after having previously fled for at least one month.

[44] The community focal points are asked to rate the motivations for mobility with a score from 0 (not important) to 2 (very important) for the majority of the mobile population.

iv. Priority needs (health, water, food, shelter, education, livelihoods and income opportunities, security, basic services)

b. **Community of Return Profiling (CoRP)**. CoRP is a quarterly assessment of communities which have experienced mobility over the previous three years.[45] The CoRP data collection follows MNM key informant and field-visit methodology. For each community included in the quarterly assessment, information is collected about key informants' perceptions about:
   i. Safety and security (frequency of security incidents; security concerns, presence of mines, forced recruitment by armed groups, local safety, freedom of movement);
   ii. Social cohesion (occupancy of property without permission, tension between population groups, exposure to retribution activities, presence of local reintegration efforts, social and cooperative exchanges between community members);
   iii. Services and infrastructures (availability of electricity, public water, fuel, education, basic health services)
   iv. Livelihood and economic conditions (whether public servants are actively working and receiving regular monthly salaries; whether private-sector employees are actively working and receiving regular monthly salaries; community dependence on debt or lending; community access to employment opportunities; current conditions of local markets and provision of essential items).

2. **Household level data** obtained from sample-based household surveys (Table A 1). The frame for sample selection of each survey is obtained from baseline population data which builds on MNM data of the month prior to the survey. Stratified random sampling is used to draw a 95% confidence / 10% margin of error sample at the subdistrict level and the number of household interviews per community (p-coded location) within a subdistrict was obtained by randomly sampling locations proportionate to population size, with replacement.[46]

Table A 1: HNAP sample based HH surveys

	Representative	2018	2019	2020	2021	2022
Demographic and WASH survey (approx. 25,000 obs.)	Syria Population / subdistrict level	May	May	January, May	January, June	January, June
IDP demographic and Intentions (approx. 18,000 obs.)	IDP population/ subdistrict level	August	October	October	October	October
Returnee demographic and socio-economic survey	Returnee population previous 12 months** / district level	--	**January,** September	--	**January**, December	--

[45] The first CoRP survey was conducted in September 2019.

[46] For returnee surveys, given the smaller size of the target population, the sample is drawn at the district level. For districts in which subdistricts (Nahya) fall under different areas of control – which can be Free Syria Army, Government of Syria, SDF, Turkish Forces – the sample is drawn at the district and area of control level. The sample allocation per community, as in other surveys, follows random sampling locations proportionate to target population size.

(approx. 5,000-8,000 obs.)	

** The sample frame for the September 2019 returnee survey includes returnees over the period January 2019-August2019.

The **HNAP demographic and WASH survey** is a large-scale survey aimed at providing subdistrict level estimates of demographic and basic socio-economic conditions of the population living inside Syria (resident, IDPs and returnees). The survey is primarily used to inform the programming of assistance of various UN agencies and humanitarian actors. While questionnaires have small differences across survey years, main modules of the survey include questions on demographic characteristics of current household members and of members who have left the household,[47] individual level basic information on labor market engagement (adult population) and school attendance (children below age 18); household level information on shelter, WASH, access to assistance, sources of income, copying strategies and priority needs.

The **IDPs demographic and intention survey**, in addition to information on demographic and socio-economic outcomes similar to those collected in the general survey population, has detailed information on displacement spells (date, origin, destination) as well as on the motives behind mobility trajectories (questionnaire elicits information on both push factors to leave origin as well as pull factor to go to destination).[48] Information on actual mobility is further complemented with questions on mobility intentions for the following year and associated push and pull factors. Moreover, irrespective of mobility intentions, the survey includes information on property ownership at place of origin, its status (whether damaged/destroyed/occupied) and possession of property documentation.

The **returnee demographic survey,** in addition to the information collected in the IDP/general population surveys, has a dedicated short module to investigate the return movement, including information on the reasons behind the decision, the assistance received and the information that hh accessed in order to make the return choice.

[47] For individuals who have left the household, the questionnaire includes information on the date when the household left and the reason (migration – internal or international, death, death due to conflict, disappearance…).

[48] Characterization of push and pull factors associated to displacement spells is similar to the one used in MNM and CoRP community surveys. Across various survey years, information on the first and last displacement before current location is always collected, in addition to the total number of displacement spells and a question as to whether a return occurred since original displacement. In addition, IDP survey of 2018 and 2019 include information on the full history of mobility spell for each household.

Annex 3: Geospatial population estimates for Syria

Currently there are four geospatial models delivering population estimates for Syria: the GHS-POP, the Gridded Population of the World (GPW), the LandScan Program and WorldPop.

GHS-POP spatial raster product (GHS-POP_GLOBE_R2023) depicts the distribution of human population, expressed as the number of people per cell. Population estimates at 5 years interval between 1975 and 2030 are derived from the raw global census data harmonized by CIESIN for the Gridded Population of the World, version 4.11 (GPWv4.11) at polygon level, and disaggregated from census or administrative units to grid cells, informed by the distribution, classification and volume of built-up as mapped in the GHSL global layers per corresponding epoch. The disaggregation methodology is described in a peer reviewed paper (Freire et al., 2016). The base source for population estimates (both census unit counts and geometries) was the raw dataset (census population at the census year and growth rates) of the Gridded Population of the World, version 4.11 (GPWv4.11).

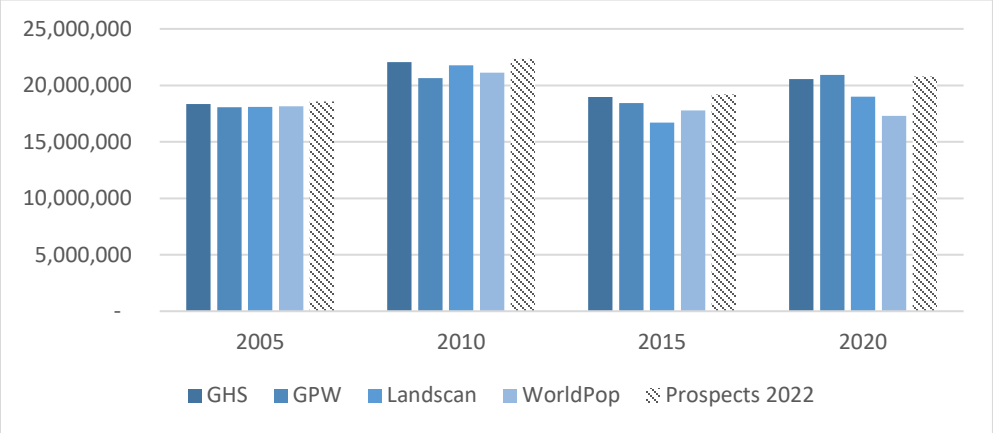
Gridded Population of the World (GPW v4.11) collection models the distribution of human population (counts and densities) on a continuous global raster surface. For GPWv4, population input data are collected at the most detailed spatial resolution available from the results of the 2010 round of Population and Housing Censuses, which occurred between 2005 and 2014. The input data are extrapolated to produce population estimates for the years 2000, 2005, 2010, 2015, and 2020. A set of estimates adjusted to national level, historic and future, population predictions from the United Nation's World Population Prospects report are also produced for the same set of years. All estimates of population counts, and population density have also been nationally adjusted to population totals from the United Nation’s World Population Prospects: The 2015 Revision.

The **LandScan Program** was initiated at Oak Ridge National Laboratory (ORNL) in 1997 to address the need for improved estimates of population for consequence assessment. The LandScan Global algorithm uses spatial data, high-resolution imagery exploitation, and a multi-variable dasymetric modeling approach to disaggregate census counts within an administrative boundary. LandScan population distribution models are tailored to match the data conditions and geographical nature of each individual country and region. Caution! It's tempting to use several years of LandScan data together to show changes in population. This is not recommended, as LandScan uses continually improving data sources and modeling. What appears as population change may merely be a result of changes in LandScan data collection and processing.

WorldPop produces different types of gridded population count datasets, depending on the methods used and end application. Examples include the 100m resolution gridded population estimates using customized methods, such as bottom-up and top-down approaches. In our case, we are using the "Unconstrained individual countries 2000-2020 UN adjusted (100m resolution)" product. This product is available for all countries of the World for each year 2000-2020 and adjusted to match the corresponding official United Nations population estimates that have been prepared by the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2019 Revision of World Population Prospects). The population mapping approach is a Random Forest-based dasymetric redistribution.

None of these sources uses the most updated World Population Prospects 2022 revision. Still, as GHS-POP is based on the 2015 Prospects revision, its population estimates for 2020 – the latest non-projection year available - are the closest to those in Prospects 2022 (Figure A 3).

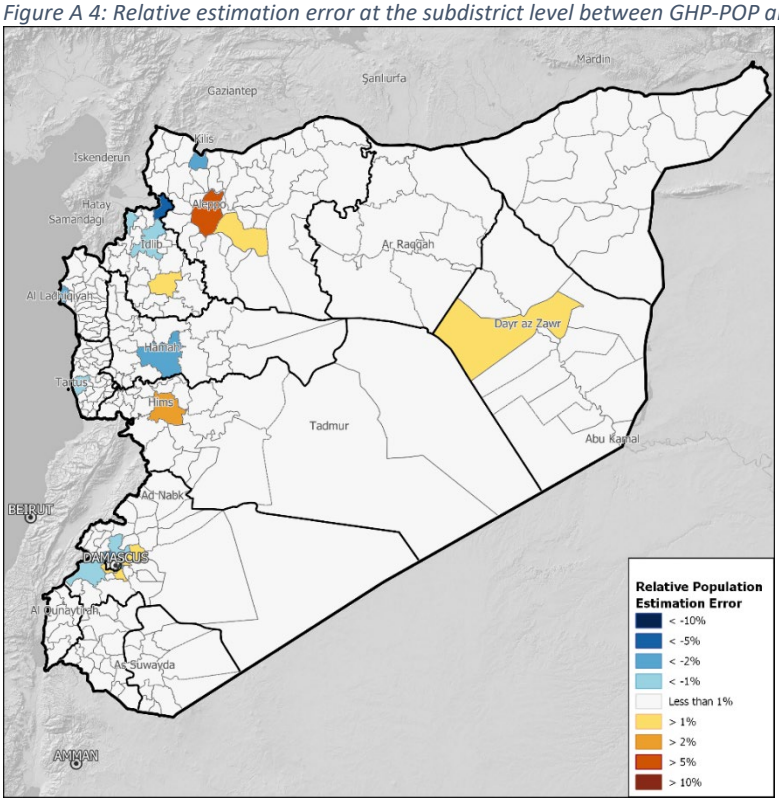
Figure A 3: Comparison between World Population Prospects 2022 and georeferenced population estimates



Source: World Bank staff calculations

It is to be noted however that some differences exist between subnational population estimates based on GHS-POP and direct counts estimates provided by HNAP, mostly due to the high internal mobility of population and presence of IDPs which is not well captured in none of the geospatial model estimates (Figure A 4).

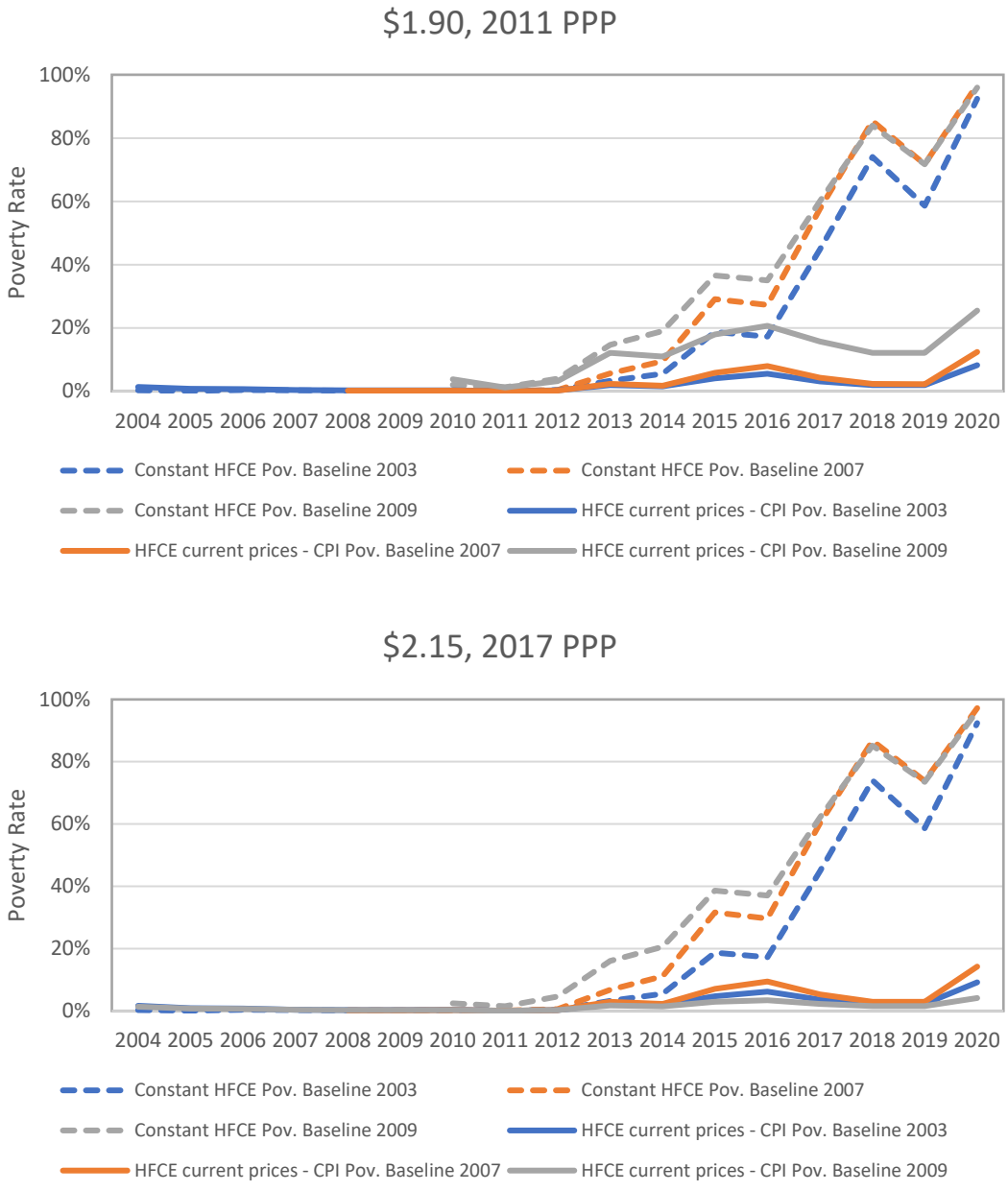
Figure A 4: Relative estimation error at the subdistrict level between GHP-POP and HNAP estimates



Source: World Bank staff calculations

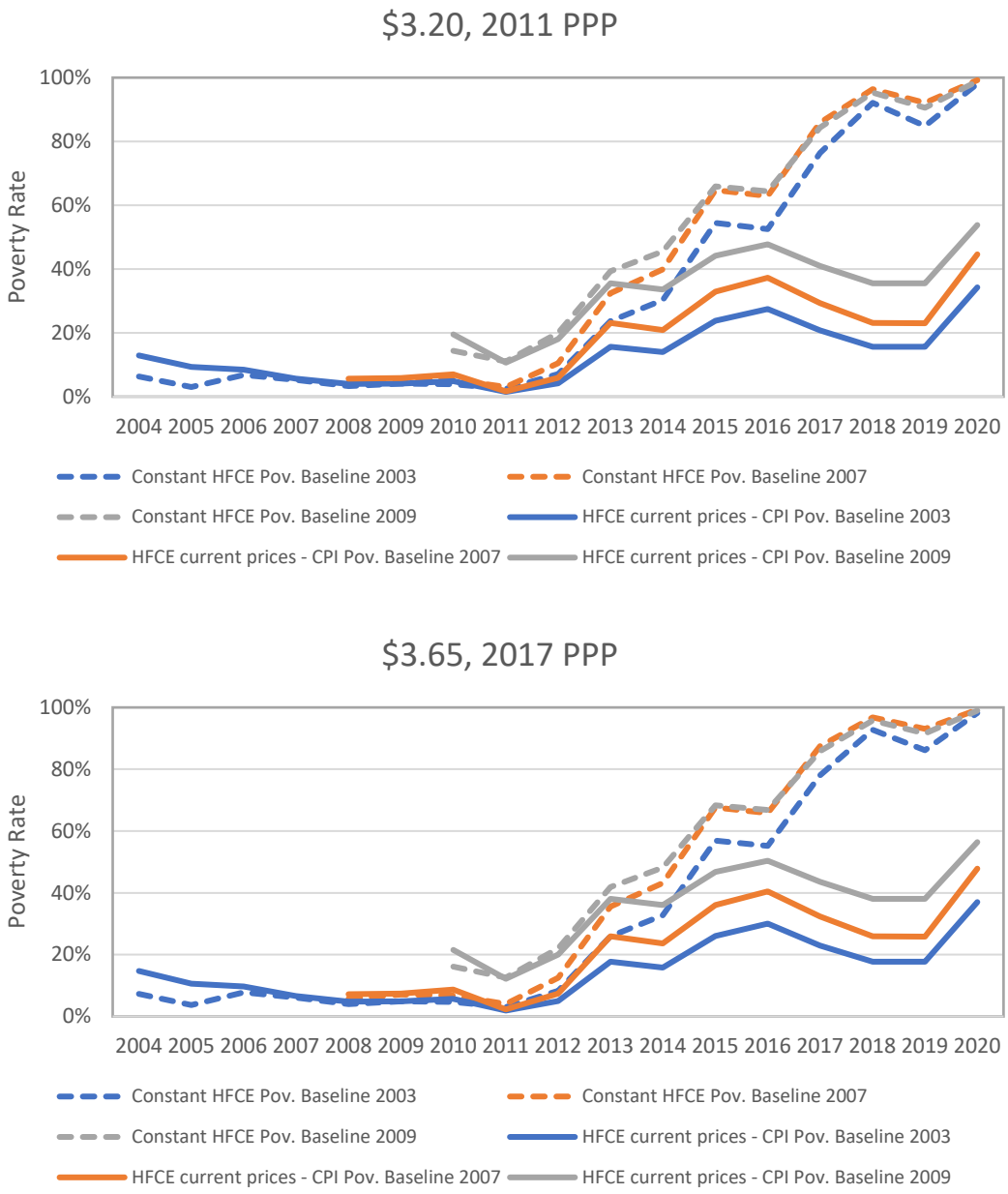
Annex 4: Distribution neutral poverty projections using private per capita consumption from NA

Figure A 5: Sensitivity Analysis of Poverty Projections at LIC extreme poverty line



Source: World Bank staff calculations, based on WDI and CBS data

Figure A 6: Sensitivity Analysis of Poverty Projections at LMIC extreme poverty line



Source: World Bank staff calculations, based on WDI and CBS data

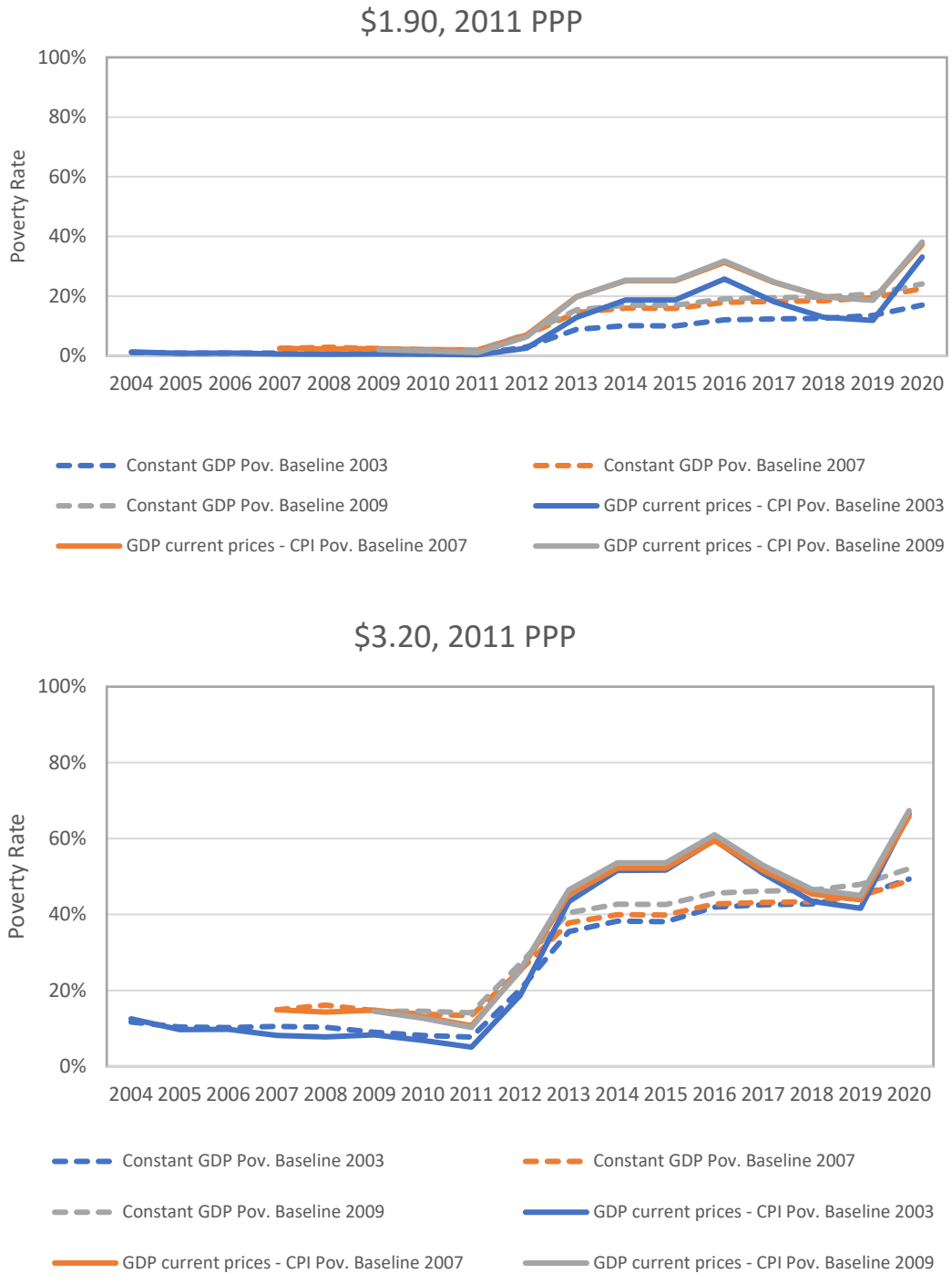
Table A 2: Comparison between baseline poverty estimates and projections for 2009

	Poverty line	Poverty estimates based on grouped data from HIES 2009	Distribution neutral poverty projections baseline 2003	Distribution neutral poverty projections baseline 2007
Constant pc GDP	$1.90	2.1%	0.7%	0.2%
Current pc GDP & CPI	$1.90	2.1%	0.6%	0.2%
Constant pc HFCE	$1.90	2.1%	0.2%	0.2%
Current pc HFCE & CPI	$1.90	2.1%	0.3%	0.2%
Constant pc GDP	$2.15	2.5%	0.9%	0.2%
Current pc GDP & CPI	$2.15	2.5%	0.2%	0.7%
Constant pc HFCE	$2.15	2.5%	0.3%	0.2%
Current pc HFCE & CPI	$2.15	2.5%	0.3%	0.2%
Constant pc GDP	$3.20	14.5%	8.9%	5.2%
Current pc GDP & CPI	$3.20	14.5%	8.3%	6.0%
Constant pc HFCE	$3.20	14.5%	14.5%	5.6%
Current pc HFCE & CPI	$3.20	14.5%	4.1%	5.8%
Constant pc GDP	$3.65	16.2%	10.2%	6.6%
Current pc GDP & CPI	$3.65	16.2%	9.5%	7.5%
Constant pc HFCE	$3.65	16.2%	4.9%	7.1%
Current pc HFCE & CPI	$3.65	16.2%	4.9%	7.4%

Source: World Bank staff calculations, based on WDI and CBS data

Annex 5: Distribution neutral poverty projections using GDP per capita, and poverty lines at 2011 PPP

Figure A 7: Sensitivity Analysis of Poverty Projections at LIC and LMIC poverty lines



Source: World Bank staff calculations, based on WDI and CBS data

Table A 3: Comparison between baseline poverty estimates and projections for 2009

	Poverty line	Poverty estimates based on grouped data from HIES 2009	Distribution neutral poverty projections baseline 2003	Distribution neutral poverty projections baseline 2007
Constant pc GDP	$1.9	2.5%	0.9%	0.2%
Current pc GDP & CPI	$1.9	2.5%	0.2%	0.7%
Constant pc GDP	$3.2	16.2%	10.2%	6.6%
Current pc GDP & CPI	$3.2	16.2%	9.5%	7.5%

Source: World Bank staff calculations, based on WDI and CBS data